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Message from the Editor-in-Chief

Hello from TOJNED

TOJNED welcomes you. TOJNED looks for academic articles on the issues of education science and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should discuss the perspectives of students, teachers, school administrators and communities. TOJNED contributes to the development of both theory and practice in the field of education science. TOJNED accepts academically robust papers, topical articles and case studies that contribute to the area of research in education science.

The aim of TOJNED is to help students, teachers, school administrators and communities better understand the new developments about teacher education. Submitted articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJNED. TOJNED provides perspectives on topics relevant to the study, implementation and management of learning with technology.

I am always honored to be the editor in chief of TOJNED. The guest editor of January, 2018 issue is Amirul Mukminin from Maleysia. Many persons gave their valuable contributions for this issue.

TOJNED and Sakarya University will organize the INTE-2018 (www.int-e.net) in July, 2018 in Paris, France.

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TOJNED invites article contributions. Submitted articles should be about all aspects of teacher education and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities.

The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJNED.

For any suggestions and comments on the international online journal TOJNED, please do not hesitate to fill out the comments & suggestion form.

January 01, 2018

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A QUALITATIVE CASE STUDY EXPLORING STUDENT COMFORT WITH AMBIGUITY IN PHYSICS, MATH, AND LITERATURE

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ABSTRACT
In this case study, we examined students' comfort with ambiguity using qualitative data analysis of interviews. We interviewed four students who had just completed an undergraduate degree in the health sciences. Even though students generally differentiated among their views about physics/math/literature, in some aspects we noticed some commonalities of the approaches that students used across the disciplines. Data analysis revealed that students' epistemologies about disciplinary content and learning seem to influence their attitudes towards a discipline. Likewise, the learning strategies and performance also depended on the level of epistemological sophistication. Although students all claimed to prefer "real world" problems and context, we found that they were uncomfortable with complex contexts and preferred to rely on authority. The similarities among student epistemology and approaches toward very different disciplines warrants further study. We believe that such interdisciplinary investigation of epistemology and ambiguity has pedagogical implications for improving student learning strategies. We suggest the necessity of promoting learning environments that will nurture the development of sophisticated epistemologies, which would enable students to navigate the ambiguous and complex realities of our fields.
Keywords: epistemology, ambiguity, authority, interdisciplinary, case study

INTRODUCTION

As educators, we can say *how* students perform and we can speculate on why *we* think they perform in the ways they do. Asking students to metacognitively reflect upon their learning processes can provide a crucial piece of the puzzle for understanding student learning by revealing how *students* think they learn. In this paper, we explore four students' retrospective self-reflections on their experience and performance in the authors' respective courses (physics, calculus, and literature). In particular, we asked students to reflect upon their experiences with coping with ambiguity in these disciplines and in teaching methods.

Our focus on ambiguity arose out of discussions among the three authors about the challenges of teaching in their various disciplines in an interdisciplinary department for health science majors. We found ourselves asking each other how students handle ambiguity in our individual classes. We became curious if students coped with ambiguity using the same strategies in different academic disciplines. Did providing context help students navigate ambiguity? These initial conversations led to a retrospective, descriptive examination of how students approached and grappled with context in three courses: Introduction to Literature, Physics I, and Calculus I (Huq, Nichols & Aryal, 2016). In that study, course work data from a small sample (24) of students shared among all three courses were compiled and analyzed to see if there was any connection between student performance and apparent comfort with ambiguity. The data indicated that high performing students were more comfortable with ambiguity in all three courses, whereas lower performing students tended to be less comfortable with it. Moreover, high performers in one course tended to perform well and be comfortable with ambiguity in the other courses. While this might not be surprising between clearly related courses like Calculus and Physics, it was a bit surprising that student performance also correlated well between Calculus and Literature. There was no obvious correlation between Physics and Literature, although students that expressed more comfort with ambiguity in one subject tended to be much less comfortable with it in the other.

The intriguing nature of these findings suggested that a case study might provide additional insight into student experience and worldview. To that end, we reviewed the correlative data and chose students who fell toward the

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mean. From these, four students (two males, two females) agreed to be interviewed about their experiences in physics, mathematics and literature, and, in particular, how they coped when faced with ambiguity in each.

THEORETICAL FRAMEWORK

Because epistemology impacts teaching and learning, it provides a useful framework for a discursive analysis of students' interview data. Personal epistemology can be defined as a person's beliefs about knowing and knowledge (Hofer & Pintrich, 1997; Sandoval 2005), and, possibly, the nature of learning (Elby, 1999; Hammer, 1989). Research into personal epistemology and learning has focused on the impact of a teacher's personal epistemology on the learning environment, the development of personal epistemology of students, and the ways in which a student's personal epistemology impacts his or her ability/preparedness to learn (Hofer, 2001). For example, research has shown that student's personal epistemology affects success in introductory physics (Lising & Elby, 2005). However, research on interdisciplinary epistemic cognition is rare (Sandoval, 2016). Nevertheless, educators must take into consideration how students' individual personal epistemologies impact how they approach learning in general, learning within a disciplinary context, and learning across the disciplines. Thus, epistemology can help us surmise from these four students' individual experiences about student learning in general.

Students' personal epistemology and expectation about a discipline may not be necessarily the same, perhaps in part because epistemological belief does not necessarily guide action (Bishop & Trout, 2003). Moreover, students typically have not yet developed a sophisticated epistemology that would allow them to incorporate new knowledge or experiences that might challenge previously held beliefs. Students may have one epistemology both about the knowledge/knowing and views about learning in the disciplines but still because of the expectations and how the course is taught or organized by instructors may have different expectations and students may study the way that is not what they think about the knowledge/knowing and also the learning in the disciplines (Elby, 1999; Elby & Hammer, 2001; Hammer, 1989; Redish, Saul, & Steinberg, 1998). We are using Hammer's (1994) framework to analyze students' epistemology about learning. The following diagram depicts the three dimensions used in the framework to show the level of sophistication (expert vs naive).

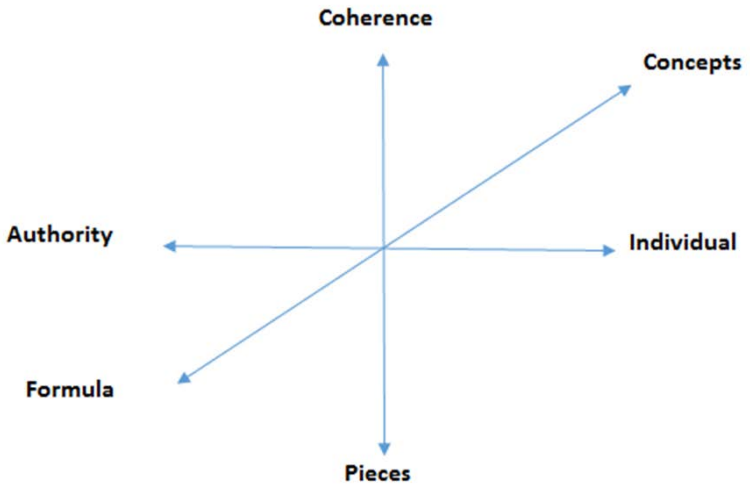

Figure 1: Three dimensions of Hammer's Framework

For example, the first axis of the framework captures the student view that learning is either acquiring new, disjointed pieces of information, which is labelled as naïve, or the view that learning is seeking or formulating a coherent meaning, which is considered more sophisticated. Another axis deals with the source of knowledge (i.e. if it is from authority or created by learners). In quantitative disciplines such as mathematics and physics, students have a tendency to rely on formula or equations rather than apply concepts in solving problems. Formula-focused views are less sophisticated than concept-focused views. In this study, we attempt to explore if and how there exists relationships or overlap between one dimension with the other dimensions. For example, if students' beliefs aligned more towards the "coherence" side of one of the dimensions, then would that necessarily mean they are aligned towards more "individual" and "concepts" in other axes?

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Students' personal epistemology associate with their learning habits and that influences their learning outcomes, understanding, and performance in the respective courses. In the classroom, we often see students with diverse degrees of epistemological sophistication. The level of sophistication indicates what they believe about the complexity and certainty of knowledge. We often notice two categories of student views regarding the source of knowledge; one is experiential (observation or experiments) and the other is the authority (teacher, books and websites). The degree of sophistication impacts students' ideas about knowledge. Moreover, students' ideas for learning and reasoning have several potential consequences in various disciplines, including quantitative disciplines such as mathematics and physics. For example, in physics and mathematics, some students expect to find rich interrelations among concepts and ideas and they try to test them in order to understand them. In contrast, some students do not recognize meaningful conceptual relationship and try to memorize each concept separately. They do not question authority and are unwilling to test new ideas and concepts for their scopes and limitations.

Experts, on the one hand, have sophisticated views that knowledge is about searching for interrelation of those facts embedded in phenomena. Scientific methods, tools, and data changes impact epistemology (Kitchin, 2014). New discoveries, theories, and principles cause disciplinary epistemologies to evolve. Thus, disciplinary experts continually change their epistemological beliefs. On the other hand, students' epistemological beliefs can be dichotomized into "naive" and "sophisticated" personal epistemological beliefs. Kuhn et al. (2000) proposed a useful framework to describe the development of student intellectual and ethical views over time/experience/academic preparation as their epistemologies become more sophisticated. One might expect that students with sophisticated beliefs have higher tolerance of ambiguity. However, research on epistemology and learning indicates that epistemological change is neither linear nor consistent (Kienhues et al, 2008), nor does tertiary schooling necessarily have (much of) an impact on naive epistemologies (Rodriguez & Cano, 2007). Thus, students struggle when they are faced with the inherent ambiguities of disciplines about which they held naive beliefs.

We decided to focus on students' experience with ambiguity because it is of particular pedagogical interest as coping with it requires a more sophisticated epistemology that can recognize knowledge as contingent. Furthermore, ambiguity raises its head in all three of the disciplines discussed in this paper. First and foremost, is the problem with language itself. Language is inherently ambiguous. For example, many quantitative sciences terms are "regular" words that have very specific disciplinary meanings, and students may not always understand their technical use. For example, "acceleration" is used to mean "go faster" in common parlance; however, in physics, "acceleration" measures the time of the rate of change of velocity.

In introductory literature courses, language ambiguity is introduced as a key literary concept and students are instructed on the way meaning in literature often depends upon the multiple possibilities of language. However, doing so often requires a curiosity to learn a robust historical context and/or knowledge of complex literary theory that students struggle to master (Lee et al, 2016, p. 171). Ambiguities, paradoxes, or contradictions abound within STEM disciplines as well, like the classical example that light is both a particle and wave, or the example Byers (2010) points out that $\sqrt{2}$ has both geometric and arithmetic meanings. Even the symbolic language developed by STEM disciplines, which is meant to clarify ambiguity, often introduces new ambiguities. Contexts play roles in navigating such symbolic ambiguity. Experts and competent students naturally manipulate symbols in such circumstances. Less competent students often fail to make relevant connections and end up using a wrong expression in a situation.

METHODOLOGY

The original sample size for the quantitative results consisted of students from a small, public, U.S. Midwestern, liberal education university, and data was collected with IRB approval (#1409S53527). Our university is unique because it has only one major, Health Sciences, that is housed within an interdisciplinary department. The interdisciplinary cohort model of our institution allows us to track students as they go through their degree program and also allows us to provide students with a consistent experience in different courses. The data presented in the original study (citation redacted) was gathered from 24 students (14 male and 11 female). Students were randomly chosen from the pool of students who took at least two of the three courses, Calculus I, Introduction to Literature, or Physics I. The ACT (MATH, ENG, SCI) scores of this group of students were representative of the first year cohort (either 2010, 2011, or 2012) to which they belong. Additionally, there was no significant difference between the ACT scores of male and female students in the group. All students took the mathematics courses before either Physics or Literature, but students took Physics or Literature in any order or in some cases simultaneously.

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From this group, we identified students whose overall scores made them fairly typical of the quantitative data. From this smaller group we identified students who had also recently graduated because we wanted them to feel free to be honest, and we thought that individuals who were no longer students would feel able to reflect on our courses openly and without fear of reprisal. From this smaller subsection, we selected four students, two males, two females met the above criteria and were willing to volunteer to be interviewed. One student was African-American, the other three students were white, and all were approximately 22 years old at the time of the interview. At the time of the interviews, two students were in graduate programs in health science fields, while two were in the workforce in non-health related areas. Students were interviewed once for around 45 minutes to an hour. Participants signed a consent form to be interviewed and were given a $10 gift card for their participation in the interviews.

We wanted to interview former students in order to gain more insight into their comfort level with ambiguity and context in all three disciplines. In a semi-structured clinical interview setting, we asked students open-ended questions about their experiences in each class. For example, we asked which concepts and problems did they find most difficult? How had they navigated those difficulties? and How would they gauge their comfort level in dealing with ambiguity and context in each discipline? We asked follow-up and probing questions when we thought more detail would be useful. We tried to get at the granularity of the real experience of individuals and provide insight into real-life situations. Because this is a case-study we asked open-ended questions that would enable us to get at student experience. The interviews intended to avoid confirmation bias by allowing students to talk about their experiences in their own terms.

The methodological framework that we used was derived from Colaizzi's process for phenomenological data analysis (Sanders, 2003; Speziale & Carpenter, 2007).We transcribed interviews and read them multiple times until we individually obtained a holistic sense of each student's epistemological beliefs about the disciplines in question as well as the learning process. Then we extracted significant statements from each transcript. We formulated meanings from these significant statements. The formulated meanings were tabulated into categories, clusters of themes, and themes. To ensure the trustworthiness of the data as much as possible, we worked through the coding until we came up with agreement about the major themes and created descriptions of them by integrating students' actual quotes. The following table highlights how the qualitative data were extracted and organized along the line of grounded theory (Glaser & Strauss, 1967) in order to determine the codes, categories and themes.

Table1: An example of coding and categorization of student beliefs about learning

CATEGORIES	Mode of learning	Comfort	Discomfort
EXAMPLE CODES	relation overlap repetition practice mapping	clear cut clear theory formula specific rule freedom in answer familiar content prior background	figuring out novel contexts word problems working backward exceptions

Table 2: An example of a flow table that extracts and formulates the meaning from themes

Learning and authority		Discomfort with ambiguity	
Sequence	Logic	Sequence	Logic
1	knowledge comes from authority	1	ambiguity leads frustration
2	authority has the answer	2	ambiguity requires dealing with novel situations/solution pathways
3	authority has specific path to the solution	3	customary to seek help from authority rather than dealing with ambiguity
4	anxiety about not matching answer/path to the solution to authority		

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All three authors of this paper examined students' quotes to rank their level of sophistication in the various disciplines independently. Later, each of us retroactively looked at the individual student performance in the respective courses. Using the interviews, we ranked the students' overall epistemological sophistication in the following order: Student 1, Student 3, Student 4, Student 2. The ranking matched completely with their course grades and problem solving scores on exams, suggesting that high-performers generally have more sophisticated epistemologies than lower-performers.

RESULTS AND DISCUSSION

We explored how students perceived several disciplines used in the study. Specific word use was collected, coded and categorized from the interview transcripts. Figure 2 provides summary of this part of our data analysis pertaining to such disciplinary labels created by the participant students. Students' generally framed the tasks and solution pathways based on what discipline they were dealing with. The framing seems to form on the premise of the words or qualifiers they used to describe related disciplines.

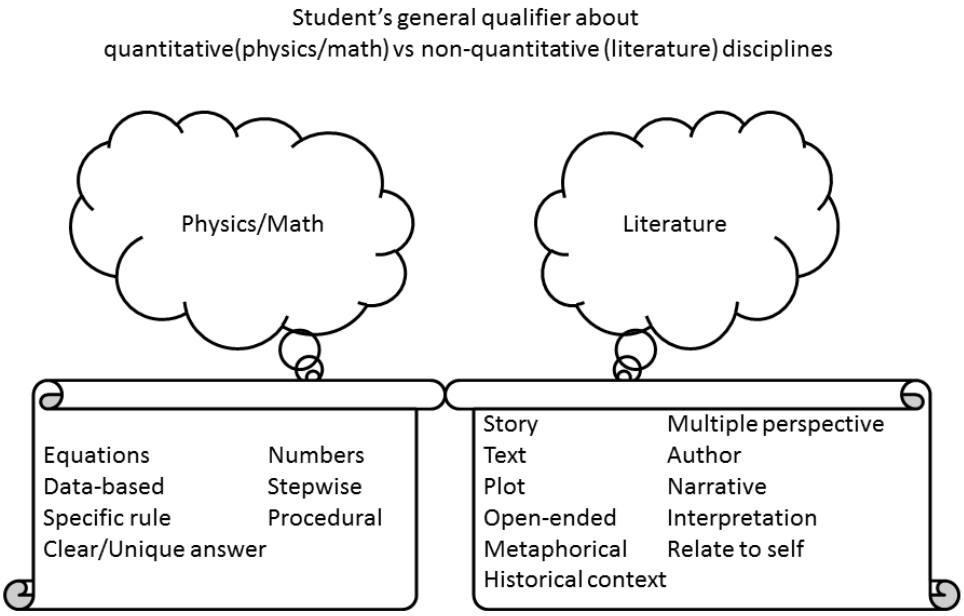

Figure 2: Students' views about various disciplines

As shown in Figure 2, these students have a naive epistemology about math and physics. They view these disciplines as rule-based and "specific," whereas experts know these disciplines are more complex. A sophisticated expert view of physics and math recognizes that, while there are many "rules," there are also ambiguities because of condition-dependent factors. Interestingly, for literature, students appear to have epistemologies closer to an expert--saying that literature has "multiple perspectives." However, as Lee et al. (2016) point out, the nature of literary reasoning is complex, complicated and contingent, requiring the problem-solver to consider linguistic structures, aesthetics, and "the nature of the human condition" (p 166). Students might recognize this complexity and ambiguity, but be unwilling or unable to cope with it. Perhaps they even state that literature has "multiple perspectives" because an authority has told them this is so. Thus, despite the appearance of a more sophisticated epistemology, our interviews revealed a great deal of discomfort in coping with ambiguity in literature and a preference to rely on the authority of the professor for answers

Our interdisciplinary investigation about students' comfort with ambiguity uses Kuhn et al's domains to explore epistemological change. According to Kuhn et al. (2000), a sophisticated epistemology is the result of the degree of coordination of the subjective and objective dimensions of knowing. Thus, sophistication depends not only on age or academic preparation, but also on the academic environment and culture. In other words, how instructors design the learning experiences can impact the epistemological progression of students. This study also revealed participants' epistemological sophistication, viz: objectivist, subjectivist and coordination. For this they used the progression levels such as absolutist, multiplist and evaluativist. A person's ability to coordinate

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the subjective and objective dimensions of knowing shows the development from a naïve to a sophisticated epistemological understanding. Kuhn et al reported that all groups of participants seem to change more readily in taste and aesthetic domains, whereas it is more difficult to change in the value and social truth domains. Furthermore, changes in epistemology about physical truth are the most difficult for every age and academic groups except for experts. Since it is hardest to develop a sophisticated epistemology about physical truth, students find it difficult to cope with ambiguity in mathematics and physics. However, because ambiguity in literature is not typically merely in the aesthetic domain but at the value and social truth domains, coping with it is also difficult for students (though not as difficult as in the quantitative sciences).

The interview data reveals that students felt discomfort with both linguistic and content ambiguity in these disciplines. All students expressed some degree of discomfort with ambiguity in all disciplines--they were "frustrated," "troubled," "anxious," or "lost." Some students were less uncomfortable with multiple pathways than others, but all were uncomfortable with open-ended questions. A student's epistemological beliefs about the discipline affected how comfortable they were when faced with ambiguity in that discipline. Thus, a belief that math is unambiguous results in more discomfort with ambiguity in math. However, even when students' beliefs about a discipline like literature included ambiguity as a constitutive element, they were deeply uncomfortable when faced with ambiguity in the learning environment. We think that this discomfort has to do with students' naive epistemologies about learning in general--in particular, that learning is supposed to be handed down from an authority rather than self-created by the learner. In fact, ambiguous problems or questions require students to navigate individual pathways that often require epistemological change. In addition to the above described trend regarding students' epistemological beliefs about disciplinary contents and learning in respective disciplines, we found other common trends. We coded the interview data in order that common categories and themes could emerge. From the coding, we were able to combine and collapse codes into common themes. The three that emerged most forcefully were Authority, the "Real World," and Problem choice.

Authority

Some questions of the interview highlight student reliance on authority. Although the interviewed students demonstrated different levels of epistemological sophistication, all preferred to rely on authority, even when they "knew" that knowledge is contingent and constructed. Student 3, for example, said he learned best in math and physics from "repetition" that "familiariz[ed]...the concepts." Repetition--memory work--locates knowledge in an outside authority. Student 4 expressed a similar belief:

> the thing I like about math and how it's different from ...chemistry [is] because usually there is a clear cut way to do something like... a formula or there is like very specific rules in math that never change and… very rarely you would find exception to the rule because it's really clear cut ... it's really frustrating when you can't figure something out that way because it should be, in theory, clear cut and able to use a formula and kinda just like...plug and chug but in a sense to do that to figure out the answer.

Student 4 expresses discomfort with ambiguity in the quantitative sciences because of her belief that these disciplines should be "clear cut" and formulaic. Her description seem to impact her naive view that physics and mathematics reasoning are merely symbol manipulation. Her response was echoed by the other interviewees who expressed discomfort even when problems were only slightly modified from the model problems. It would seem that students generally do not acknowledge that learning is dynamic creation of knowledge and there seems to be little tolerance of ambiguity.

Hammer's (1994) framework helps us surmise that these students seem to consider knowledge as static set of information rather than learning as an evolving dynamic process. In physics, for example, students believed that there should be a specific answer that coincided with a specific physical rule; therefore, there could be no room for ambiguity because that would "lead to bad situations in real life." Students' expectations about the quantitative sciences--their personal epistemologies--created blockages to their learning. Ambiguous or open-ended questions did not fit into their "math" or "physics" schemata that defined these disciplines as rigidly rule-bound, so they tend to experience discomfort when faced with these types of questions, a finding consistent with previous research (Schommer, 1990, 1993a; Schommer et al., 1992). However, personal epistemological expectations about ambiguity in literature did not enable students to cope with it any more successfully. In fact, students seemed just as uncomfortable with ambiguity in literature even though those interviewed expressed an expectation that literature was supposed to be more ambiguous. For example, Student 1 said that she "really liked the ambiguity in literature cause [sic] I really like to interpret things and look at how they can be interpreted different from different viewpoints because literature often doesn't have a correct answer." But when pressed on that topic, she also said she was uncomfortable when questions were too open-ended, such as when students were asked to "analyze this phrase and how can this phrase be interpreted where there are multiple

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interpretations." Since that type of basic discursive ambiguity is at the heart of literary analysis, it would seem that Student 1's first assertion of relative comfort with ambiguity in literature had more to do with her epistemological expectations than actual experience in the classroom--that ultimately, knowledge would come from the professor. The other students interviewed echoed Student 1. Student 3, for instance, expressed "frustration" when his answer wasn't "just the right answer...why are there all these other answer? Why is it so ambiguous?" However, past familiarity with a literary work seemed to help students cope with ambiguity. Student 2, for example found it, "really cool reading into things like [*Frankenstein*] that you were familiar since you were a child." Learning new things about a familiar topic interested him enough to be willing to cope with the discomfort of ambiguity; however, he would also "look up different synopsis or different critics online and things like that and try to get a conceptual idea." In other words, he needed to rely on authority in order to challenge his previously held beliefs.

Novelty was not always enticing enough to produce curiosity about the STEM disciplines. Our study indicated that students generally feel that physics (and science in general) and mathematics have no scope for ambiguity. They believe that quantitative sciences are primarily rule-oriented or concept-oriented and the knowledge in those disciplines are learned by knowledge transmission from authorities. For them knowledge and skills in all disciplines are learned in the same way. According to them mathematics as well as physics always have rules to follow and that rigorous practice is essential in learning those disciplines. Such belief leads to the idea that problem solving in math and physics require application of fixed set of concepts, rules, equations and procedures and it is almost impossible to come up with novel strategies that are not presented in books or presented by instructors. According to Student 4:

> With all physics I just kind of took my equation sheet and kind of looked that over really well to see what I could apply to the problem and what was really frustrating ...was none of those equations really worked for it. And so then ... I would either go to peers or just ask [to seek for help from instructor] I guess.

This student's naive epistemology made her unable to cope with the anxiety caused by epistemic doubt. Thus, she retreated to authority figures for reassurance and the bolstering of her belief in simple and certain knowledge.

Interestingly, students claimed they liked open ended questions--but only as long as they are assured by authority that there is no specific answer. In such situations they seem to prefer doing open ended problems and they think that contexts help them navigating solution path. For example, Student 4 averred:

> open ended questions were easier….there is kind of more easier where you have more freedom in your answer, when it's like context or something it's so more, I want to say, real and it's kind of ... easier if anything for me as I can visualize it in the context rather than just numbers and kind of problems solving that way. So I like context problems better.

However, students generally believe two things. First, there is always a fixed answer for a question/problem and authorities (instructor or experts) have prior expectations regarding students' answer for the question/problem. Second, in order to get to the answer there must be a unique pathway and they feel uncomfortable when they fail to identify the pathway. For example, Student 1 disliked open-ended essay prompts ones that were to "write a paper about this and you could go in any direction and I struggle to think… I am not sure what's wanted from me …I am not sure if I am going too far off topic here." The freedom to construct knowledge left her, and the other students, feeling adrift and uncertain.

The "Real World"

Students responded positively to all three disciplines when they could relate what they were learning to their lives. Making connections between what they were learning in the classroom to what they experienced outside of it stimulated interest in the subjects. Student 4, for example, said she "like[d] how it's relatable to everyday life and you experience physics every day." Similarly, she preferred learning concepts in literature that "pertained to myself... even though they were complicated I could see them kind of happening to my own life...." Being able to relate fictional and theoretical concepts to her own life helped to build scaffolding that enabled her to expand her understanding. Students also enjoyed learning about historical and cultural contexts in literature because it helped them to make sense of seemingly opaque literary works. Student 2 explained that it was helpful to learn "the time period that this literature was created, it was created for a purpose and it's important to know what the author was experiencing at the time where they put their efforts into that word and choose to write about some subjects rather than just a bunch of words on a page." All four students expressed similar opinions, especially about older historical works like *Sense and Sensibility* or *Frankenstein*. Context helped make these stories and their concerns seem "real" to the students.

Similarly, context helped elucidate STEM concepts because the "real world" could provide a sense of outside authority. Student 4 explained that "Even if you don't understand the math behind it fully at least you know the

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concepts behind it are easy to grasp because it is drawn on real life scenarios." Here, not understanding is acceptable for the student because the "real world" guarantees the concept. She can accept as true what she cannot understand because she finds evidence for it in her lived experience. The apparent absoluteness and concreteness of the "real world" becomes these students' ultimate guarantor of all knowledge. For example, Student 1 denied that physics could really be ambiguous because "look at real world applications of physics like construction those kind of things if you aren't correct in there and if you are too ambiguous… things can go pretty badly."

Even though students claimed to prefer problems that related to "the real world," they also disliked actually having to work such problems. Because the domains of epistemologies are neither consistent, static, nor linear, even students who overtly said that contexts were useful revealed anxiety or discomfort with them in practice. Students preferred to deal with problems without contexts and felt that in physics and math contexts don't help resolve ambiguity but rather makes it frustrating. For example Student 2 seems to prefer having contexts in physics; nevertheless, there is no indication that he prefers resolving ambiguity using contexts in practice:

> I think as far as physics is concerned a lot of the real world applications were real helpful because it's one of those things. Physics is always happening around us everything we are doing is physics so it definitely helped when you had examples you could kind of relate to, things that you think back to your childhood... what happened when I was on ice skates and if you drove all the way that way which way you were gonna go and what speeds so... just contextual information does help for me in physics.

This is an example of when a student's epistemological belief does not translate into action. Even though a student may know that context should help them learn, he or she is unable actually to use context to remove or navigate ambiguity. Student 3 thought that the "most difficult problems were word problems because you have the story… all this information that's kind of thrown into the story and you have to somehow pick and choose." Interestingly, this student thought that training in literary analysis actually helped him navigate STEM word problems:

> It's a bit kind of like having a literary mind to ...look back at something and say ok where/what do we start with, what is the problem, analyze this problem, how do we look at the steps that lead up to this problem kind... having a literary analytical mind helps you in understanding what's the path to this problem, how do we solve this problem.

It appears that learning explicitly about verbal ambiguity in literature has allowed this student to use the skills taught in one very different discipline to aid him in another, suggesting that students with a more sophisticated epistemologies can make interdisciplinary connections that help them succeed.

Problem Choice

At the end of each interview, the subjects were asked to pick their choice from a series of paired STEM problems. Each pair had one contextual problem and one non-contextual problem involving the same content knowledge. Each pair of the problems were generally from the same discipline. For example, one pair required calculus content knowledge. The formulaic problem involved finding derivative of a function, whereas the contextual problem involved finding the rate of expansion of a sphere. Likewise, there were multiple paired problems involving physics content knowledge. One of those pair involved calculating current through a resistor versus comparing brightness of light bulbs in a circuit. Another pair of physics problems had to do with calculation of force on a rope versus making qualitative decisions about the pain experienced by a person whose arm is pulled. For example, the third question was asked:

> You have a block and the block is applied with a force and it is accelerating and you are asked to calculate what the tension on the rope is. The other problem is, suppose a person is pulling another person on the ground and you are asked to decide how much pain the other person feels. Which one would you like to do and why?

All four stated that they would prefer to attempt the more formulaic problems rather than the contextual problems, even when they found the contextual problems more interesting, because they were more confident in finding the "right" answer to the formulaic ones. This preference highlights their reliance on authority for epistemological certainty. They were uncomfortable applying STEM concepts to "the real world" because that would require them to create knowledge without the assurance of an outside guarantor like a professor. Thus, students seem to prefer contexts in physics and math in learning content but they don't feel comfortable attempting them as tasks on their own. Using Kuhn et al., we can speculate that students who are able to handle the contextual real world problems comfortably could analyze a complex situation. Rather than exclusively relying on the information from class lectures, textbooks and websites they could coordinate subjective and objective aspects of the situation presented in a task and make informed decisions. Hence we consider such students as having more sophisticated epistemology developing as *evalutivists*.

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In response to paired physics problems Student 1, who exhibited the most sophisticated epistemology, stated: "I will be more confident in correctly answering the first one [non-contextual problem]... I would find more interesting to know what the answer is" to the contextual problem. The same student had the following response to paired math problems:

> I preferred finding a derivative [non-contextual problem] because with like this sphere expanding [contextual problem] you have so many different variable and starting it up can be real challenge to make sure that you are analyzing your variables correctly….most challenging part of my transferring it from the context to formula.

Intellectually, this student recognizes the contextual and complex nature of knowledge. However, the lack of confidence in her own mastery of that knowledge leads her to prefer tasks in which she is more guaranteed success.

Student 3, who exhibited a somewhat sophisticated epistemology, also preferred non-contextual problems because although he felt that he had a grasp on the concepts, he was not comfortable dealing with ambiguous terms like "brightness":

> I actually might want to do the one with resistance and current…. I feel like I have ...a understanding how resistors works, how current works, how I can solve voltage ….it seems to me brightness is an ambiguous term... like what does brightness mean in terms of current? what does brightness mean in terms of voltage? so I probably need to be bit more certain in terms of what is the definition of brightness [to] go about solving a problem.

This student is sophisticated enough to recognize that "brightness" is a relative term that cannot be easily reconciled to the more clearly defined physics terminology of "voltage" and "current." This student lacked confidence in his own ability to define "brightness," and thus preferred to rely on authority for the more clearly defined terms rather than attempt to create knowledge.

Student 4, who generally exhibited a naive epistemology, preferred to do non-contextual because she could not see connections between concept (current) and observation (brightness):

> I would do the second one [non-contextual problem] and now that you said derivative [in the case of calculus paired problems]. I don't know, it kinda goes against my saying of concepts but I really understood the registers very well and you taught them so I'm comfortable with them and …I would rather do resistance problem than brightness problem....

This student seems to have *absolutist* scale of epistemology. This student had difficulty in relating context to physical concepts and preferred the assurance of a clear-cut answer in the non-contextual problems. She wanted an authority to make the connections for her.

Student 2 generally exhibited the most naive epistemology throughout the interviews; however, in this situation he did seem to recognize the paired problems as equivalent problems in some instances. Nevertheless, his explanation was incorrect. In response to the physics query about tension and pain, he stated:

> I would say they are both very similar. I mean depending on the threshold of pain you could say the person could handle or how you want to measure that it would just be the force in that you have to pull. I mean the mass doesn't matter if it's a block or a person that's just the mass that you are needing to pull so I think they are the same.

Although he could recognize that "pain" is a relative term, a more sophisticated epistemology would also have recognized that both problems required him to calculate tension (force). He preferred a simplified problem and an authority to explain what to calculate.

At all levels of sophistication, these students preferred to rely on authority to solve problems. Because the contextual problems highlighted the ambiguous nature of "the real world," "the real world" could no longer function as a guarantor for the stability of phenomena. Thus, students all reverted back to relying on an authority figure as the guardian of knowledge.

LIMITATIONS

This case study has limitations in its key finding and broader impacts. One limitation is the time gap of more than a year between when the interviews were conducted and when the interviewee (participant students) took the courses. We acknowledge that a student's epistemological reflection could have evolved due to their subsequent education and time lapse; however, that distance could also offer them space to speak more honestly without fear of recrimination. Similarly, students' post-graduation activities might have influenced their views about the disciplines. For example, two students were in graduate programs in health related fields at the time of their interviews. The challenges of graduate school might impact their reflections on their conduct during undergraduate courses. We acknowledge these limitations and the small sample size. Thus, we are unwilling to overstate the theoretical implications of our findings.

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Our goal is to investigate how students holistically reflect on their learning in multiple disciplines; therefore the time gap between their learning of the courses and their reflections of the courses was beneficial. However, we hoped that matriculated students would have greater comfort with ambiguity that would have changed their epistemology. Yet the study found otherwise. None of the interviewees stated that their views about the courses had changed from the time they took course to the time of interviews regardless of what kind of professional activities they were involved with after the graduation. This suggests that unless learners gain competency/expertise through upper level courses or profession related to the courses (eg teaching and/or research in the relevant field), time lapse on learners' epistemology regarding content and learning of a course has a limited impact. Nevertheless, our study has some implications for both future research and educational impacts in similar settings.

CONCLUSION

We sought to investigate student attitudes about learning in physics, calculus, and literature in order to understand how they coped with ambiguities in each discipline. The interviews revealed that students think that they can handle ambiguity well in literature but express strong discomfort with ambiguity in math/physics. However, analysis of the interviews actually show that all four students were highly uncomfortable with ambiguity in all disciplines. Ultimately, authority-- rather than independent knowledge--had the greatest impact on their willingness to navigate ambiguity in both literature, and the STEM disciplines. Even when claiming to know that learning was contingent or constructed, ultimately these students preferred to rely on authority. Thus, any novel scenario that presented a problem they were unfamiliar with was categorized as ambiguous by them, even when an expert would characterize the problem as relatively simple or straight-forward, such as when very similar problems (but unidentical to the ones demonstrated in lecture) are used on a physics exam, or an essay is assigned in literature asking students to analyze a poem or story on their own that was not discussed in class. Because students used similar learning strategies (reliance on authority), it would appear they do not have robust or coherent learning strategies.

We wanted to explore the role of coping with ambiguity because it plays an important, if not always recognized, role in developing a sophisticated epistemology. Although it may not be surprising that students prefer not to deal with ambiguity, what is perhaps surprising is the similarities in student approaches and attitudes toward both quantitative and humanities disciplines. Because the students interviewed were all health science majors, one might surmise that they would be more comfortable in the STEM disciplines rather than literature; however, that was not the case. Student 1 and Student 3 both had more robust learning strategies that made them more successful in all three disciplines. Students 2 and 4 had more naive epistemologies and thus less robust learning strategies in all disciplines. Yet, they were very adamant that the quantitative disciplines were rule-bound. Although these students were able to superficially acknowledge the complexities of literature, in fact, they relied on authority to assure them that literature was ambiguous. This highlights the lack of coherence in their epistemologies.

The lack of coherence is exemplified in the students' views of context. Although they all resoundingly, answered that they liked having disciplinary concepts related to the "real world," the interviews revealed that students did not always like context. The more complex the context--in other words, the more provided context actually come to "the real world"--the less students liked it. Students wanted enough details to make a problem personally relevant, but still, in essence, remain formulaic. They did not actually want to navigate complex contexts to deeply explore disciplinary concepts. Thus, students enjoyed historical contexts to help make sense of literary texts; however, they preferred not to have to reconstruct historical contexts to analyze literature on their own. In the quantitative disciplines, context-rich problems were intimidating for students.

Student preference for formulaic problems is best highlighted by their consistent choice of the non-contextual physics and calculus problems during the interview. Even students who claimed to prefer "real world" problems and who thought the contextual problems more interesting still preferred to do the formulaic problem because of the assurance that an authority could decide if their answer was correct. If these attitudes are typical, this finding could raise challenges for educators who attempt to engage students by making content relatable through socio-cultural and/or historical contexts. On the one hand, if students treat these contexts as mere window-dressing, is developing them worth the significant effort to do so on the educator's part? On the other, are there ways of developing contexts that would actually spur student curiosity and desire to know?

One of the most interesting revelations from this project is Student 3's assertion that he found the skills for literary analysis useful in approaching complex contextual problems in math and physics. This student's relatively sophisticated epistemology enabled him to make interdisciplinary and metacognitive leaps. If

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students with more sophisticated epistemologies make similar leaps, then having a broad-based interdisciplinary educational base can help students develop robust learning strategies that may even improve transfer of learning. Perhaps integrating more explicit instruction of both expert epistemologies and metacognitive techniques would further improve student learning strategies and content mastery.

Our small interdisciplinary research project suggests that much remains to be learned. Although development of epistemology has be studies in various subject areas, little research has been done to examine the development of epistemology across disciplines. Our study not only considers epistemology development across disciplines, we also asked students to reflect on all three subjects within one interview settings. Students reflecting on all three disciplines, often simultaneously, required them to engage in a level of cognitive sophistication not required in similar studies that focused on a single discipline. We were surprised to observe how similarly students approached our very different disciplines. We did not expect that they would have similar beliefs and attitudes toward literature as toward math and physics. What would a larger interview sample reveal? Would students from a variety of majors have similar answers? Questions like this suggest that there is scope for more interdisciplinary research projects that examine both STEM and humanities disciplines. If students do have similar approaches to what are often seen as completely opposite--even oppositional--fields, how should that then impact our pedagogical approaches? How should it impact general education curricular design?

The findings of this case study encourages us to reflect on some important considerations that has both future research and instructional implications. Student focus on “the right answer” logically leads them to prefer the least ambiguous scenarios that provide them the greatest chance of getting “the right answer.” As education researchers and instructors, we should inquire into why our students are focused on the right answer instead of the incertitudes of our fields. What are the implications for student instruction in higher education? Do we provide enough space for students to explore, take risks, and to be “wrong” without failing? How do we best serve students coming from a K-12 system that overvalue simple “correct” answers tested in standardized ways? How do we, as educators, allow for more ambiguity in our pedagogy in higher education? Instructional models and goals should focus on nurturing students’ development of epistemology about a discipline and learning about the discipline. Inefficacious instructional design could deteriorate students’ epistemology, leading them to a naive interpretation about disciplines and about learning of the disciplines. We suggest creating an educational environment for the development of students’ attitude and ability of coping with ambiguity based on our investigation that reveals an attribution of student’s level of epistemology sophistication to their degree of comfort with navigating ambiguity.

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A STUDY OF CONFIRMATORY FACTOR ANALYSIS OF SUSTAINABLE LEADERSHIP FOR VOCATIONAL EDUCATION

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ABSTRACT
This study aims to test of the internal structure for a sustainable leadership and validate a measurement model of sustainable leadership for Vocational Education in Thailand. Sample was 404 vocational college administrators derived from multistage sampling method. The measurement model consists of the following: sustainable leadership matters; sustainable leadership lasts; sustainable leadership spreads; justice in sustainable leadership and doing no harm to others; the recognition and promotion of diversity; sustainable development; and respecting, honoring and learning from the best experiences. The confirmatory factor analysis was employed as an analytical technique for the proposed model. The results show that sustainable development indicator makes the highest contribution to sustainable leadership, that vocational school administrators have to responsible for resource management and conservation; they must establish and nurture a favorable environment within the organization and encourage constant evolution through the development of the skills and abilities of the members of the organization.
Keywords: Sustainable leadership, vocational education, confirmatory factor analysis, sustainable development

INTRODUCTION

In order to survive and remain competitive in an increasingly borderless world, organizations must develop and maintain sustainable practices. Thus, organizations worldwide have recognized the importance of sustainability and given it priority as a key strategic goal (Siegel, 2009). Sustainability as a general principle has gained widespread acceptance, and its principles can be highly relevant for organizations and their missions. It is now recognized that initiatives in sustainable development are necessary to facilitate continual organizational evolution, taking into account the long-term sustainability of the organization and the integration of clear, shared perspectives (David, Cheri, & Nathan, 2011).

A crucial aspect of sustainable development in the organizational context is sustainable leadership. It is evident from recent literature that leadership should be people-centered and resource-based, and there has been much discussion of a need for a new paradigm relevant to leadership development within organizations (Casserley & Critchley, 2010; Crew, 2010; Hewision & Griffiths, 2004). Nevertheless, there has been a general failure on the part of organizations to modify their perspective on leadership accordingly and to take advantage of the possibilities and opportunities arising from the adoption of successful leadership development (Crew, 2010). For organizations, the concept of sustainable leadership incorporates all of these considerations and advocates a shift in emphasis away from the traditional (Casserley & Critchley, 2010; Crew, 2010).

The concept of sustainable leadership can be applied in many different contexts. In particular, Davies (2007), Fullan (2005), Hargreaves and Fink (2006), and Lambert (2011) all explore the concept of sustainable leadership at an organizational level in the educational sector. In this era of globalization and rapid change, it is vital that school administrators have a deep understanding of and play an active role in human resource development. In order for sustainability to become a whole-school approach, a change in the school culture is necessary (Ilisko, Skrinda, & Micule, 2014). This in turn requires sustainable leadership (Ilisko & Badyanova, 2014). However, as the concept of sustainable leadership is still in its infancy (Lambert, 2011), there exist few guiding factors for its implementation.

This research examines the emerging literature on sustainable leadership with an aim to developing a confirmatory factor analysis based on elements of sustainable leadership in the educational context. The

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research utilizes these elements as the foundation of its analysis of the characteristics of vocational college administrators. In addition, the research aims to determine whether the sustainable leadership model is applicable to college administrators. In other words, the model aims to inform theoretical and practical instruction management as a set of guidelines for the further development of sustainable leadership among vocational college administrators and other organizational.

LITERATURE REVIEW

Leadership

Leadership is a term with a broad range of meaning. In general, leadership implies the ability to motivate subordinates and influence their attitudes and behavior so as to encourage cooperation in the achievement of organizational goals. Leadership is a key factor not only in corporate and general management but also in education. Stogdill (1974) defines leadership in terms of a relationship between the work of group members: leadership involves participation in operations and enhances the ability of groups to accomplish organizational goals. Bass (1985) and Bass and Riggio (2006) characterize the role of leaders as the focus of the group: leaders, through their individual personality, encourage others to cooperate using incentives rather than force, and their influence is a powerful tool for shaping the behavior of group members. The roles and responsibilities of leaders involve a variety of initiatives for achieving innovation. Stoner and Freeman (1989) state that leadership involves guiding the processes and influencing the activities of members of the group. Hersey, Blanchard and Johnson (1996) define leadership as the process used to inspire individuals or groups to achieve appropriate targets for the given circumstances, while Lipham (1998) characterizes leadership as a process that creates initiatives or new structures. Leadership, then, aims to achieve the objectives and goals of the organization or to change these purposes and goals.

Hellriegel, Slocum and Woodman (2001) define leadership in terms of development goals and vision: this involves not only the implementation of goals and vision but also the fostering of values that promote them. Leadership involves both making decisions and influencing others to accept them. Yukl (2010) advocates the concept of “new leadership”, which refers to the process of influencing others through contact that fosters mutual understanding, leads to willing cooperation, and supports the efforts of individuals or groups of people to achieve targets cooperatively. Thus, leadership requires attention to organizational vision, values, and culture. Leaders must be actively involved and committed to achieving the desired leadership effects in order to achieve effective results for the organization.

Leadership and sustainability also depend on values that are rooted in ethics. Environmental and social awareness are key features of sustainable leadership, which requires integrity in behavior and values for the continued development of sustainable growth. Knowles, Twomey, Davis, and Abdul-Ali (2009) maintain that the principles of sustainable development require a focus on leadership that protects and fosters the principles of sustainability.

Sustainable leadership implies courage in maintaining a beneficial social and economic environment for future generations. Leadership for sustainability benefits both leaders and followers, and indeed all social, environmental and economic stakeholders affected by the actions of individuals and organizations. Given the crucial contribution of education to sustainable development, school administrators must understand and play a role in human resource development in this era of globalized innovation and rapidly-developing competition. Leadership by vocational education administrators requires the ability to communicate in order to build effective and successful educational institutions. In turn, organizational change and long-term sustainability through corporate leadership requires vocational education leadership to equip future generations with the skills and knowledge required for sustainable leadership.

Concept of Sustainable Leadership

Sustainable leadership is a newly defined term in organizational leadership research (Hargreaves, 2007; Lambert, 2012). Sustainable leadership is based upon the notion of ethical leadership (Brown & Trevino, 2006), but extends its area of application by claiming that it is ethical that we take into consideration the needs of a wider range of stakeholders', including future generations and the natural environment. In essence, sustainable leadership is distinguished by pursuing the value of sustainability at the individual, organizational, social and ecological level for both current and future generations (Olivier, 2012).

Sustainable leadership focuses on relationships between people and resources not only within the organization but also in the organization’s social and natural context. It does no harm to and actively improves the surrounding environment. It does no harm to and actively finds ways to share knowledge and resources with the local community. Sustainable leadership is not self-centered; it is socially just. By exercising justice in the

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development of existing resources, sustainable leadership promotes cohesive diversity. Just as strong ecosystems are bio-diverse, strong organizations promote diversity and avoid the standardization that weakens learning, adaptability and resilience in the face of unexpected changes and threats. Rather, sustainable leadership fosters and learns from diversity in teaching and learning and stimulates progress by creating cohesion and networking among its richly varying components. Sustainable leadership develops and does not deplete material and human resources. It recognizes and rewards the organization's leadership talent in earlier rather than later career stages. Sustainable leadership takes care of its leaders by encouraging them to take care of themselves. It renews people's energy. Sustainable leadership is prudent and resourceful leadership that wastes neither its money nor its people.

Thus, sustainable leadership must incorporate ethical values and take into consideration social and environmental issues. Lambert (2012) develops a model for sustainable leadership to be implemented as a tool for organizational capacity building in education institutions. The model consists of six components including capacity building in staff, strategic distribution, consolidation, building long term objectives from short term targets, diversity and conservation.

The concept of sustainability must be central to the mission of the organization, and initiatives in sustainable development must continue to make organizational changes. The sustainability of the organization in the long term must be recognized to create an integrated perspective (David, Cheri, & Nathan, 2011). Sustainable leadership preserves and advances the most valuable aspects of life over time, from one leader to the next. As Collins and Porras (1994) remind us, 'all leaders, no matter how charismatic or visionary, eventually die'. The challenges of leadership succession, of leading across and beyond individual leaders over time, are at the very heart of sustainable leadership and educational change. Sustainable leadership sustains as well as depends on the leadership of others. In a complex world, no one leader, institution or nation can control everything without help. Sustainable leadership must therefore embrace distributed leadership by stimulating leadership in others.

Finally, sustainable leadership honors and learns from the best of the past to create an even better future. Amidst the chaos of change, sustainable leadership is steadfast in preserving and renewing its long-standing purposes (Hargreaves & Fink, 2004). Administrators must lead and implement ideas with integrity if they are to foster the sustainability of the organization (Knowles, Twomey, Davis, & Abdul-Ali, 2009). Much change theory is change without a past or a memory. Sustainable leadership, in contrast, revisits and revives organizational memories and honors the wisdom of their bearers as a way to learn from, preserve, and then move beyond the best of the past (Davies, 2007; Fullan, 2005; Hargreaves & Fink, 2006; Lambert, 2011).

The concept of sustainable leadership is of great significance for educators. In the educational context, sustainable leadership is leadership for learning and leadership for caring for and among others; it is a creative and learning mode of leadership that preserves, protects and promotes in education practices that sustain and enrich human life (Hargreaves & Fink, 2004). While creating a learning environment that would promote interest toward the sustainability, the importance for building a shared vision and for the form and content of sustainability (Salite, 2008). Education, in turn, lays the foundation for sustainable leadership in future generations. The role of education in fostering sustainable development is recognized by global institutions under the rubric of Education for Sustainable Development (ESD). Since the UN General Assembly declared 2005–2014 to be the UN Decade of Education for Sustainable Development (UNDESD), a number of UN agencies, NGOs, regional bodies, and partner networks have engaged in activities supportive of ESD. However, the experiences of these organizations have shown that successful implementation of ESD requires further research if policy commitments are to be made (UNESCO 2007, 2009). ESD aims to help people to develop the attitudes, skills, and knowledge required to make informed decisions for the benefit of themselves and others both now and in the future, and to act upon these decisions (UNESCO 2012). ESD promotes sustainable thinking and acting. It enables children and adults to make decisions and at the same time understand how those decisions affect future generations and the life of others. Similarly, ESD aims to inspire a new generation of responsible citizens by promoting, through education, the knowledge, skills, values, perspectives and practices essential to a sustainable future (Bell, 2016).

METHODOLOGY

This quantitative research aims to study the components of sustainable leadership and confirmatory factors analysis of sustainable leadership in vocational education. The questionnaire was used to examine the behavior of the administrators in vocational education institution. This measurement model of sustainable leadership base on Kline, (2011).

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Participants

The study was conducted in a vocational education, selected by multi-stage sampling according to the proportion of population numbers of vocational education administrators from 413 public institutions. 404 (84.17%) questionnaires were completed and returned. Of these participants, the great majority were male (79%), more than 45 years old (78%), and had at least 15 years of work experience (82%) and 5 years of administration experience (74%).

Procedure

The data utilized in this study were obtained by the researcher by means of a closed questionnaire. The tools used in the research and quality audit consisted of a sustainable leadership expression questionnaire based on Hargreave and Fink's (2006) concept of sustainable leadership, and shows the meanings and indicators of sustainable leadership. The following are details of characteristics of sustainable leadership as indicated from the components above (Table 1).

Table 1: Components, Meanings and Indicators of Sustainable Leadership

Components	Meaning	Indicator
1) Sustainable leadership matters	School administrators create and learn to maintain, protect and promote sustainable education. This includes morals, ethics, lifelong learning and the creation of opportunities for staff to develop their capabilities.	1) creativity and learning 2) preservation, protection and promotion of sustainable education 3) creation of ethics 4) learning and wider lifelong education 5) opportunities for staff and capacity development
2) Sustainable leadership lasts	School administrators ensure continuity by maintaining sustainable leadership.	1) transferring of leadership 2) creating a line of leadership succession 3) keeping and maintaining sustainable leadership
3) Sustainable leadership spreads	School administrators develop the leadership structure, convey leadership strategies, invite opinions and share decision-making, encourage the involvement of stakeholders, and share responsibility.	1) leadership development 2) transferring leadership strategies 3) exchange of opinions and share decision-making 4) participation of stakeholders and delegation of responsibility
4) Justice in sustainable leadership	Just administrators do no harm to others, are enthusiastic to improve the environment, and share knowledge and available resources in the best interest of society.	1) having justice 2) no harm to others 3) enthusiasm to improve the environment 4) sharing of knowledge and available resources 5) uphold the interests of the public and society
5) Recognize and promote cohesive diversity	School administrators understand and promote diversity and create standard criteria for all. They learn to adapt and be flexible to changing threats and promote awareness and learn from variety.	1) understanding and promoting diversity 2) creating a standardized basis 3) learning and adapting to changes and threats 4) promoting awareness and learning from diversity
6) Sustainable development of human resources	School administrators create and promote a favorable environment. They encourage the organization to be constantly evolving and support their subordinates through the development of skills and abilities.	1) creating, maintaining and promoting a favorable environment within the organization 2) encouraging the organization to constantly evolve 3) developing the skills and abilities of the members of the organization 4) making returns 5) having support for the process of leading subordinates

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		6) having intelligence
7) Respecting, honoring and learning from the best experiences	School administrators are to respect others, learn lessons from experience, and maintain and repurpose goals to respect and honor all members in the organization.	1) respecting others 2) learning from experience 3) maintaining and repurposing corporate goals 4) respecting and honoring the wisdom of people in the organization

(From: Applied in Hargreaves & Fink, 2006)

The instrument used for data collection was a Likert-scale questionnaire sent to respondents. Items concerning the behaviors of sustainable leadership of vocational education administrators were based on the concepts of Hargreaves and Fink (2006) with a rating scale of 5 levels: most, much, moderate, little, and least.

There were 37 items in total. The sustainable leadership questionnaire consisted of seven components (labeled STL1 – STL7): the importance of sustainable leadership (STL1); ensuring that leadership remains sustainable (STL2); the distribution of sustainable leadership (STL3); justice in sustainable leadership and doing no harm to others (STL4); the recognition and promotion of diversity (STL5); sustainable development (STL6); and respecting, honoring and learning from the best experiences (STL7). The questionnaire was developed by means of the Index of Item Congruence (IOC), the index varied from .67 to 1.00. The disposition component of the sustainable leadership questionnaire was tested for reliability in terms of internal consistency based on a Conbrach's coefficient of .964.

Data Analysis

Data analysis was conducted and sustainable leadership (STL) was analyzed as a latent variable determined by the seven observed-variable indicators (STL1-STL7) corresponding to the sustainable leadership components listed above. The results were analyzed by means of Confirmatory Factor Analysis (CFA). AMOS version 23 was used to perform the CFA of the sustainable leadership questionnaire analyzing the fit of models and its respective parameter estimates. CFA is a multivariate analysis used to test concepts based on multiple measured indicators (Tabachnick & Fidell, 2007). It is not a method for identifying structural factors, but rather a method to confirm the existence of a specific structural factor (Raykov & Marcoulides, 2000). One of the advantages of Confirmatory Factor Analysis is its flexibility when applied to a complex hypothetical model. Estimation methods used in Confirmatory Factor Analysis involve a maximum likelihood factor that can determine the optimal value of the factor loading. A valid indicator is said to be convergent if the loading value on standard regression weight is greater than .5 or $p < \alpha = .05$, the chi-squared (χ^2) value is small, the significance probability is greater than .05 ($p>.05$), the CMIN/ DF is less than 3.00, RMSEA is less than .08, the GFI is greater than .90, the AGFI is greater than .90, and the CFI greater than .90 (Kline, 2011).

RESULTS

The analysis of sustainable leadership among vocational college administrators yields the following correlations. Table 2 shows the correlation coefficient among the seven observed variables. Twenty-one pairs had a correlation between .561 and .764, a result that is statistically significant at the .01 level ($p<.01$). Every pair shows a positive correlation between variable relevance. The correlation coefficients of the variables with the highest scores, .764, correspond to the relationship between sustainable development (STL6) and respecting, honoring and learning from the best experiences (STL7) and to the relationship between the recognition and promotion of diversity (STL5) and the development and maintenance of resources (STL6). A lower correlation (.750) was found between the importance of sustainable leadership (STL1) and ensuring that leadership remains sustainable (STL2). The coefficients of the variables associated with the lowest correlation (.650) is the relationship between ensuring that leadership remains sustainable (STL2) and justice in sustainable leadership and doing no harm to others (STL4).

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Table 2: Descriptive Statistics and Zero-order Correlations (n=404).

observed variable	Correlations								
	$\bar{x}$	SD	STL1	STL2	STL3	STL4	STL5	STL6	STL7
STL1	4.475	.4909	-	.750**	.749**	.619**	.670**	.732**	.644**
STL2	4.396	.4857		-	.716**	.561**	.657**	.692**	.624**
STL3	4.423	.4739			-	.671**	.722**	.721**	.626**
STL4	4.542	.4268				-	.671**	.674**	.640**
STL5	4.411	.4631					-	.764**	.666**
STL6	4.426	.4855						-	.764**
STL7	4.391	.4351							-

**$p < .01$

The analysis of sustainable leadership among vocational college administrators indicating confirmation of the variable components of sustainable leadership. The chi-square = 6.768, df = 6, p = .343 shows a chi-square value not significantly different from zero; χ^2 / df = 1.128, which is less than three. The GFI (= .995), AGFI (= .978), RMSEA (= .018) and CFI (=1.000) indices indicate that the model is in harmony with the empirical data or theoretical construct validity. The weights of the variable component of the observed variables are all positive and non-zero. The observed sustainable development variables range from a high of 0.876 (STL6) to a low of 0.767 (STL7) (Table 3). All loading factors are significant (p = 0.000). These outputs indicate that convergent validity requirements are fully met.

Table 3: Confirmation of the variable components of sustainable leadership (STL) (n=404)

Latent Variable	Observe Variable	Factors analysis of sustainable leadership				
		b_{sc}	S.E.	t	p	Reliability
STL	STL1	.836	.059	16.449	.000	.964
	STL2	.780	.064	15.829	.000	
	STL3	.834	.059	17.327	.000	
	STL4	.781	.051	17.225	.000	
	STL5	.862	.060	18.151	.000	
	STL6	.876	.051	22.225	.000	
	STL7	.767	<- ->	<- ->	<- ->	

Notes: $p < .01$, b_{sc} – the coefficient of standard factor loading, <- -> parameters no report is S.E., t and p

The test results of the measurement model using the complete program can be seen in Table 4. The construct measurement model testing using CFA was performed for more than one round. In this case, the model was adjusted using modification indices (Arbuckle & Wothke, 1999). The aim was to produce a construct measurement model with goodness of fit indices fulfilling the requirements or cut-off. The output of the goodness of fit index calculation on the construct measurement model, which displays the seven criteria used to assess the appropriateness of the model. The results indicate that the model is acceptable that is, there is a match between the model and the data.

Table 4: Test Results for the Measurement Model of Sustainable Leadership

Criteria	Cut-off Value	Results	Status
Chi-square	expected to be small	6.678	-
Significance Probability (p)	> .05	.343	Good fit
CMIN/DF (χ^2/df)	< 3.00	1.125	Good fit
GFI	> .90	.995	Good fit
AGFI	> .90	.978	Good fit
RMSEA	< .08	.018	Good fit
CFI	> .90	1.00	Good fit

*Based on Kline, (2011)

Table 3 indicates that the overall fitness index yields a chi-square value with a sum of 6.678 (p=.343), indicating a confirmed goodness of fit status. Other indices, namely CMIN/DF (χ^2/df), GFI, AGFI , RMSEA and CFI also show a confirmed goodness of fit status. Overall, the construct measurement model can be declared as having been validated. Further, CFA was used to test the construct validation, namely the convergent validity. The convergent validity of the construct measurement model was tested based on the loading factor (Kline, 2011). The loading factors are shown in Table 2, and the measurement model is portrayed graphically in Figure 1.

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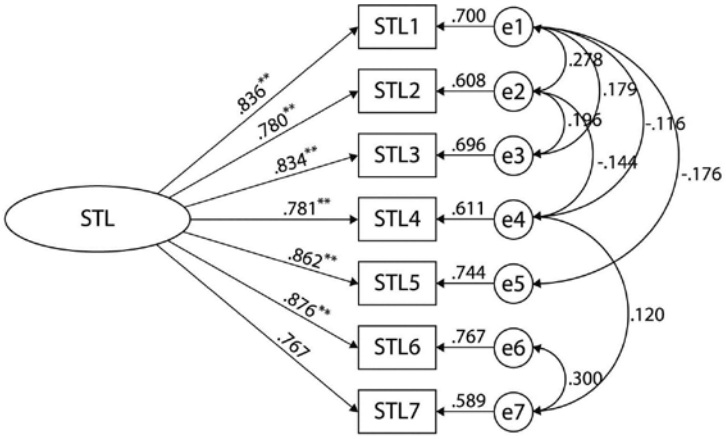
Figure 1: Measurement model of Sustainable leadership



Chi-square = 6.678, df= 6, *p* value = .343, χ^2/df = 1.125, GFI = .995, AGFI = .978, RMSEA = .018, CFI = 1.000

DISCUSSION

The results of the confirmatory factor analysis of the sustainable leadership model for vocational college administrators indicate that the sustainable leadership model is consistent with empirical data: chi-square = 6.678, df = 6 , p =.343 (p > .05 indicates consistency), CMIN/DF (χ^2/df) = 1.125 (acceptable levels are lower than 3.00), RMSEA = .018, (acceptable levels approach 0.00), CFI = 1.000, GFI = .995, AGFI = .978 (acceptable levels approach 1.00)(Kline, 2011), and the coefficient of standard factor loading ranges from .767 to .876. The coefficient of standard factor loading of variables was different from zero with a statistical significance of .05 (p<.05). The factor analysis of sustainable leadership for vocational college administrators also show that the sustainable leadership model is consistent with empirical data: the coefficient of standard factor loading of variables was different from zero with statistical significance of .01 (p<.01). The highest level variable was sustainable development (STL6, b_{sc} = .876) followed by recognition and promotion of diversity (STL5, b_{sc} = .862) and the lowest factor loading variable was respecting, honoring and learning from the best experiences (STL7, b_{sc} = .767). The obtained analysis was used to verify the sustainable leadership for vocational college administrators as a fundamental data for establishing and promoting sustainable leadership to exist and to be able to manage human resources, budget and academic affairs in institutions (Lambert, 2011; 2012). The vocational school administrators are responsible for resource management and conservation; they must establish and nurture a favorable environment within the organization and encourage constant evolution through the development of the skills and abilities of the members of the organization, their cleverness and wit supporting their process of leading subordinates. Building capacity and creating involvement and development of strategic measures of success (Davies, 2007). Therefore, the vocational school institutions need to conceive of sustainable leadership as something that lasts beyond the tenure of any one person. This could mean ensuring selection criteria for new leaders incorporate a commitment to the values and changes the incumbent leader and staff have put in place. In addition, the distribution of leadership will ensure there are people within the institution who can sustain a change agenda over time.

CONCLUSION

The results indicate that the measurement model of sustainable leadership of vocational college administrators is an appropriate and valid model: its components (the importance of sustainable leadership; ensuring that leadership remains sustainable; the distribution of sustainable leadership; justice in sustainable leadership and doing no harm to others; the recognition and promotion of diversity; sustainable development; and respecting, honoring and learning from the best experiences) are convergent, discriminable, valid and reliable. The loading values are all higher than 0.5, and are statistically significant (p<0.01). The research indicates that the sustainable development indicator makes the highest contribution to sustainable leadership by vocational college administrators. Overall, the results indicate that the proposed sustainable leadership model was consistent with empirical data. It may therefore be of use in the development of guidelines for sustainable leadership, especially in the educational sphere.

This study investigated only the opinions of vocational education administrators, did not study the opinions of both teachers and stakeholders. The acquisition of the information on sustainable leadership may not be comprehensive. The future research should study the opinion of both teachers and stakeholders. In addition, this

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research is for public vocational institutions only. Therefore, it should be studied in private vocational institutions for the acquisition of sustainable leadership of the executives are more complete.

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A STUDY ON IMPACT OF ORGANIZATIONAL CULTURE IN TEACHING FACULTIES IN ENGINEERING COLLEGES WITH REFERENCE TO CHENNAI

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ABSTRACT
Organizational culture helps in understanding how employees feel about their work. Culture involves general assumptions and appropriate goals for the organization as a whole and for departments within the organization, and personal goals for employees. It makes the nature of the psychological contract of special importance in the pursuit of organizational success. It is represented by formal goals, structures, policy and communication. This research work tries to examine the influence of organizational culture in engineering colleges which has impact on work behavior of teaching faculties. The Hofstedes cultural model is used for evaluating the impact of Organizational culture. The study uses survey research method. The respondents were selected by using simple random sampling techniques. The sample size 220 was selected from engineering colleges. Primary data were collected through questionnaire. Data were presented and analyzed by means of simple percentage and our hypotheses were tested by Correlation and T test. Recommendations were also made to the organizations that will find this study relevant to their course to make their culture simple and easy to grasp and adhere to so that their employees can be free to put in their best.

INTRODUCTION

Culture is a global phenomenon that can be defined in numerous ways. In the words of F.B Taylor, “the complex whole which include knowledge, belief ,art ,morals ,law ,custom and any other capabilities and habits acquired by man as the member of society”. Alternatively culture is defined as social domain that emphasis the practices, discourses and material expressions which express the continuities and discontinuities of social meaning of life. It shapes the individual behaviour faced at different spheres of life. Culture is an arrangement of attributes that express an organization and differentiate the firm from other one (Forehand and Von Gilmer, 1964). According to Hofstede (1980), culture is the collective thinking of the minds which create the difference between the members of one group from another. As per Schein (1990), defines culture is a set of different values and behaviour that may consider as a guide to success. According to Kotter and Heskett (1992), culture means fairly established set of beliefs, behaviours and values of society contain generally. Each organization represents the multitude with the distinct character and the consequence of relationship that are unique. Organizational culture represents the collective values, beliefs and principles of organizational members and is a product of such factors as history, product, market, technology, and strategy, type of employees, management style and national culture (Needle 2004). Organizational culture is a delineative term which is concerned with how employees apprehend the morale, ethos, temperament of an organizations culture. This assessment of the organization gives the melded and conglomerate impression of the organizational culture**.**

IMPORTANCE OF ORGANIZATIONAL CULTURE

Organization is the most common manifesto where the individual work together to earn profit and subsistence where they could make their dream bigger and better. Each and every organization bestows a unique working style known as culture. The culture is the proportion of beliefs, values, ideologies and expected behaviour of that organization. It is important to recognize that there are essential components to define organizational culture (Luthans, 1998). Concept of shared meaning, the notion that organization constructed socially, organizational culture has, many symbolic cognitive layer and reside at all levels within a company. The culture decides the interaction of the employee at their workplace. A beneficial invigorating culture motivates the employees and also makes them loyal

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towards the management. The culture at the workplace promotes a fine fettle competition. In order to earn the acknowledgement and indebtedness from the superiors employees try to perform the level best in the organization. The culture represents the predefined policies that provide direction at the workplace. This culture narrates the employees about their roles and responsibilities, and also how much to accomplish the task that are assigned to them ahead of the deadlines.

LITERATURE REVIEW

Organizational Culture which is an often used prevalent topic among the in charge of each departments like managers, consultants and academics. As an import of distinguishes the members of one group from others. Enterprise culture gives distinctiveness to organizations, groups and individuals.

There is not a single definition for the concept of the organizational culture there are several. For instance, "Organizational culture is a pattern of shared basic assumptions that the group learned as it solved its problems that has worked well enough to be considered valid and is passed on to new members as the correct way to perceive, think and feel in relation to those problems" (schein); "Organizational culture is the set of beliefs, values and norms together with symbols like dramatized events and personalities that represent the unique character of an organization and provides the context for action in it and by it"(Gareth Morgan); " the set of beliefs, behavior, norms and values helps in making culture most effective" (Kottler). Even if there is no single definition for the concept of the organizational culture and even if cultures are vary from one to another. This unique features of the organization makes it distinctive from other organizations. It influences everybody and is also influenced by everybody's thinking and action. Hofstede (2010) introduced an onion model to cover the total concept of culture including four aspects, they are symbols, heroes, rituals and values. Organizational culture is a determinant of the productivity level of the organisation in the sense that it is the Input of the employees to the organisation that determines its productivity level. A small change in organisational culture will lead to a change in employee work behaviour. Therefore, organizations should make the changes in their culture easy for their employees to learn and adapt to. Organisational culture has a significant influence on employee work behaviour. OLU OJO (2012) .The managers should allow employees to be actively involved in decision making in their organizations. This would spur employees' commitment towards the attainment of corporate objectives. As employees understand the goals of the organization and work towards their attainment, their level of commitment increases. Furthermore, managers should as much as possible encourage flexibility in the performance of tasks in the organization. Ezekiel Saasongu Nongo & Darius Ngutor Ikyanyon 2012 The study was conducted to understand the importance of Organizational Culture in enhancing the Employee Job Attitude. According to Harrison & Stokes (1992), culture shapes both beliefs and attitudes of all Organizations Members and accordingly their behavior and most importantly their performance. This study examined the impact of four Organisational Cultural variables namely Autocratic, Technocratic, Entrepreneurial and Bureaucratic on employee attitude to the organization and found a strong correlation between Organisational Culture and Employees Job Attitude. Shweta Awasthi (2013)

PROBLEM STATEMENT

Without the effective organizational culture, organization cannot achieve its goals. It plays a crucial role in the development of organization. Organization culture has positive influence on work behaviour. To find how far the culture influence the work behaviour.

THEORETICAL FRAMEWORK

Organizational culture is defined as expansively constructed, chronicled based system of conjecture, efficacy and expound framework that usher and constrain the members of the organization to perform their roles and accosting the provocation of their circumstances.

FRAMEWORK COMPOSED OF THREE LEVELS

Organizational level:

The individual enter into organization with the variegated emotion whether he/she may adapt themselves to the surroundings and establish their talents or to toil for one's distinctiveness. The manager plays an indispensable role and communicates about the moral principles, code of behaviour, mission and vision to the employees in an organization. These things help him to develop the conception of firm and also to be cognizant of work culture.

This individual also not acquainted with the history of organization and thus has to be communicated by his superiors and fellow-workers.

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Individual level:
At individual level, a person is impacted by several traits that guide his behaviour at all aspects. An organization composed of these individuals carries a manifold values, beliefs and assumption to form the behavioral pattern. The manager should focus the activities by knowing the dynamics of the behaviour and motivating them to support the workplace and to frame the culture.

Departmental level:
This represents the internal working condition of the organization. . A person with low disposition will place self-goals, own interest and benefits as his priority rather than agglomerate or collective behaviour and therefore show the capitalistic or individualistic behavior**.** It is necessary to actuate the employees to work as a team. The prompting of the workplace cooperation has been the abstract for the self-willed contribution of the employees to succeed in completing the independent task. The temperaments are shaped through the agglomerate and capitalistic behaviour. People with high disposition engage as a team player and cooperate with others for mutual benefits and shared goals.

ORGANIZATIONAL CULTURE AND ITS DIMENSIONS
The culture influence the business behaviour, Hofstede implemented his studies in the workplace to identify the culture. He collected large amount of the databases from the IBM between 1967-1973.

Power Distance
Power distance is the first dimension identified by the Hofstede; it addresses the inequality of the society. Some people have more social status and respect at their institutions and organization, while some have more powers than others, shows that the powers are unequally distributed. The different society has a wide range of solutions to deal with the societal inequality. According to Hofstedes research, not all the society considers inequality as a problem. In the workplace culture, the boss-subordinates relationship is considered as objective for power inequality. In larger power distance, supervisors and subordinates consider each other as unequal. The power is centralized at the top management. In smaller power distance, the subordinate and the superior relation are pragmatic. The power is decentralized among the organization.

Individualism and collectivism
It is the second dimension addressed by the Hofstede. It states about the organization interest and self-interest. He indicated that group interests are valued more than the interest of the individual whereas in the individualist society, individual interests are valued more than the organization interest. In the workplace culture, the individual culture act according to their interest and are accepted to match with the interest of the organization.

Masculinity
Every society consists of the males and females reflect the nature in terms of cultural values, gender roles and power relations. They are biologically distinct. Males are considered as taller and stronger, at the same time females are thinner and agile. In masculine culture, some occupations are gender based. They emphasis on achievements, growth and challenges in jobs. In the feminine culture, emphasized on good working conditions and job satisfaction are preferred. This dimension spotlight how the society which put into effect the stress for the achievement or nurture. Masculinity is seen to be the trait which emphasizes emulation, remuneration of wealth. The concept of masculinity recalibrate historically and culturally.

Uncertainty avoidance
It is the fourth dimension. All the human beings have to face the fact of unknown situations. Human society developed certain ways to deal with those situations. They are technology, law and religion. By using the technology along with their advancement people avoid the uncertainties. Law prevents the behaviour of the people. Religions are assumed to control the people's personal future.

Long-term orientation
In the Hofstede cultural dimension theory long term and short term orientation can be interpreted as dealing with the searching of the virtue, focusing on the future and paying attention to learning and perseverance, while the other concern with establishing the truth.

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METHODOLOGY

Research Design

The purpose of a descriptive research is to examine a phenomenon that is occurring at a specific place and time. A descriptive research is concerned with conditions, practices, structures, differences or relationships that exist, opinions held processes that are going on or trends that are evident.

Survey Research Method

Survey research method is a design in which data is collected with questionnaires or through personal interviews with members of an identified population. A questionnaire is being framed for collecting appropriate data required for the information based on Hofstede's five dimensions- power distance, uncertainty avoidance, individualism/collectivism, masculinity/feminity, long term/ short term orientation.

Data Collection

Data's are first-hand information that are collected through questionnaires using various methods such as interviewing, mailing. The major tool used to collect data was a structured questionnaire.

Questionnaire Design

The questionnaire was structured and closed type questions were used. The questions formulated were clear, easy, understandable and simple. Scaling technique used here is Likert scale. Questionnaire is prepared based on the objectives framed.

Sample Size

A sample of 220 employees was considered for the study and data was collected.

Simple Random Sampling Technique

A method of probability sampling in which a sample of n elements is randomly chosen without replacement from a population of N elements.

Hypothesis

There is no significant relationship between intention to stay and job stress prevailing in an organization.
There is no significant difference between marital status and job security
There is no significant difference between gender and change in work task

RESULTS

Correlation between intention to stay in company and job stress prevailing in the organization
Hypothesis
H0: There is no significant relationship between intention to stay and job stress prevailing in an organization.
H1: There is significant relationship between intention to stay and job stress prevailing in an organization.

TABLE REPRESENTING CORRELATION BETWEEN INTENTION TO STAY IN COMPANY AND JOB STRESS PREVAILING IN THE ORGANIZATION

	Mean	Standard Deviation	N
Intension to stay	2.88	1.164	220
Job Stress	2.54	1.349	220

		Intension to stay	Stress
Intension to stay	Pearson Correlation	1	0.125
	Sig.(2-tailed)		0.064
	N	220	220
Job Stress	Pearson Correlation	0.125	1
	Sig.(2-tailed)	0.064	
	N	220	220

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There is no significant relationship between intention to stay and job stress (0.064>0.05) Accept Ho but r=0.125. From the obtained results it can be stated that stress does not affect the employees at higher rate, but the correlation confirms that stress is existing in the company. Stress at low level shows that there is good organizational culture prevailing in the organization and hence employees also have intention to continue in the same profession.

T-TEST

T-Test between marital status and job security

Hypothesis

H0: There is no significant difference between marital status and job security
H1: There is significant difference between marital status and job security

TABLE REPRESENTING T-TEST BETWEEN MARITAL STATUS AND JOB SECURITY

	MARITAL STATUS	N	Mean	Standard Deviation	Standard Error Mean
Job Security	Married Unmarried	194 26	2.57 2.42	1.287 1.172	0.092 0.230

		Levene's Test for Equality of Variances		t-test for equality of means		
		F	Sig.	t	df	Sig. (2-tailed)
Job Security	Equal variances assumed	0.615	0.434	0.541	218	0.589
	Equal variances not assumed			0.581	33.617	0.565

		t-test for equality of means			
		Mean Difference	Standard .Error Difference	95% Confidence interval of the difference	
				Lower	Upper
Job Security	Equal variances assumed	0.144	0.266	-0.381	0.668
	Equal variances not assumed	0.144	0.248	-0.360	0.648

From the results obtained from the T-Test difference which is between job security and marital status, Levene's test for equality, where 0.434 is greater than 0.05,hence we see the upper value ,which is 0.589,greater than 0.05, hence we accept H0.Everyone is given job security equally; all of the employees feel secured in working in the Organization. Security is one of the basic requirement according to Maslow's hierarchy, hence this factor influences employee to work better.

T-TEST BETWEEN GENDER AND CHANGE IN WORK TASK

Hypothesis
H0: There is no significant difference between gender and change in work task
H1: There is significant difference between gender and change in work task

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TABLE REPRESENTING T-TEST BETWEEN GENDER AND CHANGE IN WORK TASK

	GENDER	N	Mean	Standard Deviation	Standard Error Mean
Change work task	Male Female	122 98	3.06 2.49	1.173 1.048	0.106 0.106

		Levene's Test for Equality of Variances		t-test for equality of means		
		F	Sig.	t	df	Sig. (2-tailed)
Change work task	Equal variances assumed Equal variances not assumed	0.311	0.577	3.738	218	0.000
				3.785	215.53	0.000

		t-test for equality of means			
		Mean Difference	Standard . Error Difference	95% Confidence interval of the difference	
				Lower	Upper
Job Security	Equal variances assumed Equal variances not assumed	0.568 0.568	0.152 0.150	0.268	0.867
				0.272	0.863

From the results obtained from T-Test, difference between change in work tasks and gender, P value is less than 0.05 and F value greater than 0.05, there is difference between change in work tasks and gender. Male and female employees work tasks differ according to their capabilities. Jobs based on the abilities of employees would reduce the stress, since the work is up to their knowledge, this would induce them to create interest in work.

FINDINGS

The frequency analysis on gender reveals that 55.4% of total sample were male and 45.5% are female employees. The frequency analysis on marital status implied that nearly 88.1%of total employees are married and only 11.8% of employees are unmarried. It has been found from the frequency analysis that there are four groups of experienced employees of total sample, where 32% of them belong to 0-5 years, 62% of them belong to above 5 to 10 years, 3% belong to above 10-15 years and 2% of them belong to above 15 to 25 years. From the obtained results of correlation, it is found that stress accounts for 1.6% of variability in intention to stay in organization. Though stress is positively correlated to intention to stay in organization, it can account only for 1.6% of variation in the organization. From the results obtained from the T-Test difference which is between job security and marital status, Levene's test for equality, where 0.434 is greater than 0.05,hence we see the middle value ,which is 0.589,greater than 0.05, hence there is no significant difference between job security and marital status. From the results obtained from T-Test, difference between change in work tasks and gender, P value is less than 0.05 and F value greater than 0.05, there is difference between change in work tasks and gender.

RECOMMENDATIONS

From the frequency analysis it can be suggested that, female employees can be recruited in job equally to that of male employees. Single employees can be focused on jobs equally to that of married employees; since they are single their jobs take a higher interest in their lives. Hence there are more chances to have more passion towards the

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work and also follow the culture and values in the organization. All the employees have respect towards organizational culture in different ways, this may be due to different educational qualifications According to the stress level, it is well understood that there is tolerance level of stress for employees. From this it can be stated that everything is planned perfectly and along with this employees who also cooperate so that the work is being completed successfully. Hence unnecessary stress is avoided. This can be maintained and well planned work can be carried out always to meet unstressed success. Since there is various task assigned to male and female employees depending upon their capabilities. And there is also chance for change in work task for both male and female employees. There is a good cultural values prevailing between organization and employees which can be sustained to make employees work more efficiently and effectively.

CONCLUSION

The findings of this study states that Hofstedes dimensions of organizational cultural factors has influence on employee work behavior. The main focus of this study is to make recommendations that will help managements to create, maintain, sustain and otherwise modify culture in a way that it will help improve employee work behavior The conclusions we can deduce from the study that there is good organizational culture prevailing in the organization along which required measures have to be taken for sustaining present organizational culture which influences employee work behavior.

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ASSESSMENT IN THE LMD SYSTEM FROM A PURELY STUDENTS' PERSPECTIVE: GAINS, DRAWBACKS AND FUTURE PROSPECTS

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ABSTRACT
Although decision makers are still uncertain about the efficacy of the incorporation of the LMD system in the different Algerian universities' institutions, it should be admitted that the applicability of such a new system in the university has become a current actual fact whether at the level of the training course syllabus or at the other sphere of the other administrative acts and planning. In fact it is under this scope that the present paper shed light on one important factor in the teaching –learning process which is evaluation and assessment in the LMD system from a purely student's perspective. The aim was to depict the students' views and attitudes towards the whole process and criteria of evaluation being set and put for them under the new LMD system. It should be known that students are assessed and given grades throughout the semester (ongoing assessment) and at the end of each semester (final exam). The final grade is based on both grades using a weighting scale. A wide range of assessments methods are used including examinations, quizzes, homework, oral presentations and essays. The study was conducted with twenty Master students in Chlef University .The purpose of the study was to investigate the students' views and attitudes towards the current assessment methods applied in the LMD system. The data collected through online questionnaires raised our attention to one serious matter which is that of the fact that some students still ignore a lot on the scale and grid of evaluation of the current LMD system with regard to the different modules' set credits for instance. Besides, some students admitted that their keen interest for grades worked negatively on developing their learning skills and knowledge development. However, the students showed their praise and satisfaction for the new way of evaluating the examinee's performance which is based on the combination of the coursework assignments and sit-down exams.
Keywords: LMD system, assessment, grades, credits

INTRODUCTION

The LMD system was launched in the Algerian universities in the academic year 2003-2004.After about a decade of implementation, it is useful to evaluate some prominent points of this system. In addition to some obstacles that prevented the fast success and efficiency of the LMD system such as the lack of human and material resources, the big size of the groups and the number of groups per module, the new implemented system also raised the matter of assessment as another debatable issue for both teachers and learners. The present paper will shed light on one type of assessment which is summative assessment since it is liable to be measured and the one which has a direct relation with the students' tests , scores and grades. We shall depict the students' views, attitudes and expectations of the assessment related aspects in the LMD system. This is to be carried through a structured questionnaire to a group of LMD students at Chlef university but let us first proceed by some definitions and key concepts related to the topic. As a matter of fact, the introduction of the LMD system in the Algerian universities came as a necessary step to cope with the international requirements of what is happening in the field of education and world economic and technological innovation and progress. It's implementation was to offer the Algerian students greater chance for more flexibility in their programs of study and facilitate their mobility task at the national and international level. Hence; the LMD aims at bridging the gap between book knowledge and the job market demands. Currently, in Algeria, the system is in the use phase since most of the Algerian universities have adopted the LMD system. Indeed, the LMD is designed so that all system components, including teachers and students have become involved in training and are no more spectators as in the "classic" system: the teacher has the opportunity to offer training courses tailored to the available resources and skills based on a pedagogical team and the student has the opportunity to choose the path that suits him. As being the core element in any new adopted system or syllabus, one cannot neglect the learners' own perception of the matter of bringing their own views before the community practitioners in the framework of any newly incorporated system. More importantly, no one can deny the degree of the assessment importance in the in the students' learning life career. Because it occupies such an important part of the students' interest, the teacher is supposed to play the student's guide to the challenges of the assessment .Indeed, instead of having an adversarial relationship, teacher and student are allies. Nevertheless , the current assessment fact in most of our universities still reoccurs as a machine-score that displays grades via one shot tests that do not give real chance of self-correction and feedback process for the students; a chance that could help them for more refinement and self –improvement.

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Eventually, The current study aimed at investigating the students' views to the assessment methods already being implemented in the LMD system whose aim was to offer students a more free space of autonomous learning under new pedagogical management .Yet , the newly established system seem to use the same previous assessment and evaluation methods of the old system. Hence, it was important to review the students' views , attitudes and aspiration with regard to the same applied assessment methods for such newly adopted LMD system.

LITERATURE REVIEW

The LMD system: An overview

The new higher education reform also known as the LMD (License- Master-Doctorate) system has been gradually being introduced in our country since 2003-2004. The LMD system came as a natural process to technological breakthroughs, complex international relations and overlapping of economic interests in the new millennium. The implementation of the LMD system's aim in the Algerian Universities is to offer students increased flexibility in their programs of study, greater autonomy in their professional career development and more facilities in their mobility at the national and international level.

LMD Objectives

The LMD system main objective is to bridge the gap between the gained knowledge at university sphere and the job market demands .Besides , the new reform system envisaged a number of long term objectives .It aimed , for instance , at improving both of the quality of the university education It also aimed at the development of academic training vocationally and promoting the staff and students' mobility. Finally , One ultimate objective of the LMD system is to restructure of the higher education institutions and promote practical knowledge .Yet, this would not be achieved without adopting a credit system known as the European Credit Systems (ELTS) as a first step in the process of the LMD system implementation.

With the application of the new system, new keywords have emerged :

-The Semester :

The semester is the period of time necessary to complete an actual course of study during an academic year. In the new structure, the academic year is divided into two academic semesters. A semester counts 16 weeks of study and assessment, comprises 4 modules in average and includes at least 360 hours of study.

-The Module :

The module is the basic unit of university education assigned in one semester. It consists of 1 to 2 coherent and autonomous disciplinary elements allowing a smooth assessment of learning outcomes. Each module has a minimum of 75 hours of study (or 20 to 25 days of field work). In a modular program, courses can be taught in the form of theoretical courses and/or directed works and/or practical works and/or practical field activities. A module is validated after student's success in continuous assessment or catch-up session.

-Validation :

The assessment of knowledge, skills and competencies are the key cornerstone of the new educational system.In the LMD architecture, the assessment of student's acquisition and learning Is semestrial and not annual. This mode of evaluation is more rational on the educational level, since it gives more emphasis to the interactive relationship during the course rather than the simple exercise of memory. Such a method of assessment equips the student with the required tools since it is organised in a wide range of exams namely tests, presentations reports……etc in addition to a possible catch up test. In order to progress in his university studies, the student should validate modules. A module is validated if its global mark is superior or equal to 10 out of 20.Eventually, the course is validated only if all its modules and semesters are validated .A validated course gives right to acquisition of the corresponding graduate diploma.

With regard to Chlef University, the LMD system was implemented in the English department in the academic year 2009-2010.Just like in some other universities who has recently adopted the LMD system , the

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implementation of that new reform system in the Chlef University and in the English department in particular has faced and still facing some obstacles that may look similar to that of the "classical system" when referring to a recently opted English department like that in Chlef University.the lack of human resources , the lack of training for the current teaching staff on the LMD system instructional key aspects and the big size of the groups are among the main problems that emerge as real obstacles in the path of the success of any newly adopted reform system such as the LMD system.

Classroom Assessment

Assessment is one important teaching element in the teaching process since it is about evaluating how much learners have acquired . Classroom Assessment is the observation of students in the process of learning, the collection of frequent feedback on students' learning, and the design of modest classroom experiments that provide information on how students learn and how students respond to particular teaching approaches. According to Grant (1993) Learning cannot take place without criterion-referenced assessrnent, no rnatter how good the teaching is. Successful learning depends upon adjustrnent in response to feedback. Classroom assessment helps individual college teachers obtain useful feedback on what, how much, and how well their students are learning. Faculty can then use this information to refocus their teaching to help students make their learning more efficient and more effective.

A conspicuous ambiguity often emerges when coming to draw a distinction between assessment and evaluation. We find it necessary to make matters rather clear right from the beginning for most readers who want to know the difference between the two key concept so that that we can proceed tackling the idea of assessment; the core point of our study, on a plain foundation.

Assessment

It should be mentioned that the term assessment takes its roots from the Latin word assidere" which means to sit beside to make calculations. . Brown (2007) defines assessment as "…an ongoing process that encompasses a much wider domain. Whenever a student responds to a question offers a comment or tries out a new word or structure, the teacher subconsciously makes an assessment of the student performance». Hence, assessment is feedback from the student to the instructor about the student's learning. Brown and knight (1994) put more emphasis on the students' behaviour diagnosis when they stated, ""Assessment is at the heart of the student experience"

Evaluation

Evaluation uses methods and measures to judge student learning and understanding of the material for purposes of grading and reporting. Evaluation is feedback from the instructor to the student about the student's learning.By definition, evaluation is about attributing a value to test takers' work. According to Lynch (1996), evaluation refers to a systematic attempt to gather information in order to make judgments or decisions. Evaluation is just as important as assessment in the learning process . According to Davidson (2005), Evaluation seems to provide a strategic procedure as it envisages what comes after the collection of data and the value judgment " only evaluation can tell us 'So what?"

Types of assessment

The role of assessment in the learning process seems basic and fundamental since according to Pelligrino, Chudowsky, and Glaser (2001) , It provides feedback to students, educators, parents, policymakers, and the public about the effectiveness of educational services.Two main types of assessment are identified : Summative and formative assessment .

Formative assessment (Latin Formare: to shape/ to mold/ to make) :According to Sawyer (2004) , it takes place during the course of teaching and is used essentially to feedback into teaching and learning .Consequently, FA is an assessment for learning.Formative assessment is rather anonymous and is almost never graded .Its aim is aim is to provide faculty with information on what, how much, and how well students are learning.

Summative assessment (Latin summa: sum/ total): Includes tests and other graded evaluations. According to Sawyer (b 2004) , summative assessment (SA) an assessment which takes place at the end of a term or course

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and is used to provide information about how much students have learned and how well a course has worked. Eventually, Summative assessment normally leads to an award of qualifications: grades, diplomas, and certificates. Therefore, SA is basically an assessment of learning. Therefore, the main purpose of SA is to grade or judge or appraise the sudents'performance and progress through exams, quizzes , tests worksheets and other formats of graded assignments.

We have tried to focus in our present study on the that last type of assessment which is summative assessment since it seems to represent a decisive stage in the students' learning career and the one which has received much debate and arguments among the university students; the testee and the teachers; the tester as well.

Current Assessment Related Key Issues

Because of being so delicate and decisive in the students learning life career , many key concept emerge to interweave with the idea of testing .Indeed, when we assign a value we produce an impact on the student's behaviour and attitude who is supposed to be the primary client of all assessment .Hence, assessment should be designed to improve performance must ensure that the primary client for the information is well served as well. Nevertheless, there still some serious challenges that can devalue of the assessment set objectives in particular and the teaching-learning process as a whole.

Focus on the Answers 'Correctness

One important key feature of a well-designed test or any other type of exam is that which gives more emphasis and seeks the student's ability to extend his/her ideas rather than the correctness of the given answers .However, one can sometimes encounter types of tests where the assessor seeks exact well-definite answers sometimes just for the sake of facilitating the correction task later. Hence, this will eventually have a negative effect of the students' performance since much of his/her abilities of creating meaning and extending ideas will be inhibited. This key feature is intensified by the new trend of questioning where set tests tend to include standardized short-tests of targeted clear direct answers such as multiple choice questions for instance. With regard to that type of questions , students are not tested on the way they use , extend ,or criticize "knowledge" but on their readiness to generate a superficially correct response on cue. Indeed, the willingness to save time and labour by the teacher when designing such type of tests has played a negative role on the real aim of testing that of exploring the students learning potentialities.

Lack of Tester and Student Relationship

Grant (1993) highlights the element of compromise that exist in an testing task. According to him , the precision in scoring requires more simplified and decontextualized tasks' patterns.. the students also feel deprived of access to resources and can neither adapt the question to personal style nor interact with questioner ; a fact that leads to standardization which would widen the gap between tester and student. . Indeed, the distance between the assessor and the students is growing more and more due to the fact that the designed tests tend to suit more the teachers own pace, interests and way of conception to the tests objectives and , thus , the testing formats. Yet, the students' interests and even their own conception of a beneficial testing should be taken into consideration before the setting of any type of test or exam's exams. The current exams' methods unfortunately, prevent the student from questioning the tester about the questions, the methods, or the results. Besides,by our own philosophy of testing that has been harmfully limited to a mere score or grade that is supposed to measure the students' progress and learning we are putting much threat and pressure on the students' psychological state .The other role of the assessor is to help the testee to avoid all sorts of test's anxiety and threat before seeking all other objectives from his testing.

More Scores Less Feedback

Talking about the teacher-students' relationship in the testing process will lead us to talk about the notion of respect to the first client of testing; the student. Using the word "respect" when talking about tests , exams , grades, and the like may seem like an odd word but it can the appropriate word for a new conception and rethinking of the traditional habits of testing. While being involved in any type of assessment, the assessor can either respect or disrespect the student by his /her behaviour and attitudes to the student's feedback to the target test or exam questions. One good sign of respect, for instance , is allowing to all to the students to explain themselves when we think that they have erred or when we do not understand their answers (a fact that is commonly and socially accepted in our relationship with people).Moreover, it is disrespectful to give a one shot test that carry no more than a mere score without any mentioned helpful feedback from the part of the teacher.

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One important role of the teacher is to sustain the students in the learning process. A good sign of sustainment to give ample opportunity for students to practise , refine and master a task that we wish them to do and certify the efficacy that comes from the cycles of model :practice , feedback and refine . Yet, the one shot test is to deprive the students from such a fruitful opportunity. After all, we should be fully aware as teachers that our students have a right to ask for our justification about our point of view to each time they get the chance to receive our assessment to their class performance. It is time to stop considering the assessment task as a mere scrutiny that can only provide grades as clarified Michel Foucault's (1979) words “Our "modern" testing systems are built upon an ancient human urge to perpetuate a "marking and classification". to move to the level of making from it an important step of adjusting students’ performance and learning practices.

Is it an Error or a Mistake?

One other important element that needs the teacher’s care and consciousness when being involved in the assessment task is the ability to hold a fair attitude to distinguish between the student’s committed mistakes and errors .We are all convinced that an error is the result of some sort of ignorance of the correct form of the language usage .However, a mistake is generally is the outcome of carelessness or forgetfulness of such correct form. Let our assessments therefore routinely encourage students to distinguish between what they do and do not know with conviction. Let us, therefore design scoring papers that can carry empathy to the students’ committed errors which are the result of honest admission of ignorance or confusion and at the same time heavily penalize all sorts of feigned control over already taught language forms. As a matter of fact, let us give a try, for instance, for students to write a paper in which they critique the previous one they wrote. By doing that, it’s the student’s responses that are becoming our first matter and not his or her errors. Errors have always existed and will always exist as long as we are learning. Thus, the teacher’s main challenge is help students discover their areas of weakness and strength by implementing more in their errors. We should be aware as teachers that we are leading the students through a long up and down path that would finally lead the students to growth and progress.

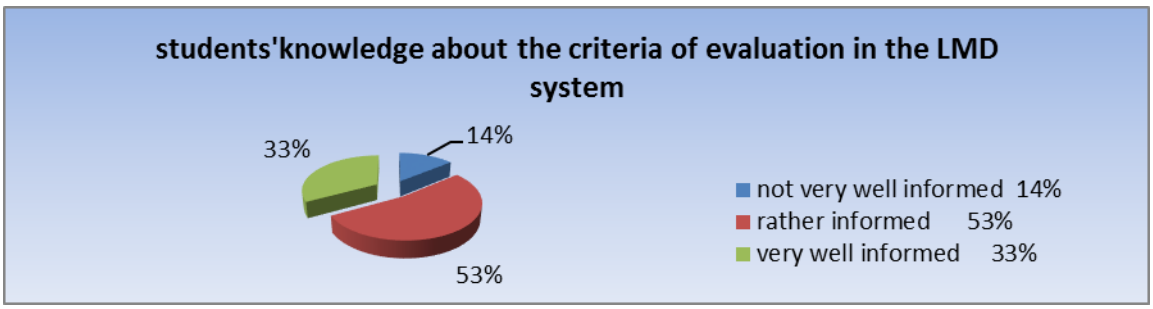
METHODS

Method of data collection and analysis

As already stated , the purpose of the current study was to identify the students’evaluation of the assessment methods used under the LMD system approach .The study is based on an [1]online survey questionnaire of about 15 close ended(three MCQ and 12 graded questions) questions that addressed a group of twenty one LMD students with the aim to depict the students’ own evaluation, opinions , attitudes and expectations of the current LMD assessment methods and tools. The selected sample randomly included students from first, second and third year level.The twenty one participants included students of both genders (15 female and 6 male students) , all of them are from the Chlef.area.The students were invited to tell about their opinions and major expectations of the newly set LMD criteria of testing and evaluation at the end of the questionnaire. The questionnaire was used since it is capable of collecting large amount of large amount of factual and behavioural information that is readily processible (Dörnyei 2007).The collected data is clearly exposed in the following findings:

How much are you knowledgeable on the new set criteria of evaluation in the LMD system?

	Responses	Percentage
Well-informed	7	33.3%
rather informed	11	**52.4%**
very little informed	3	14.3%



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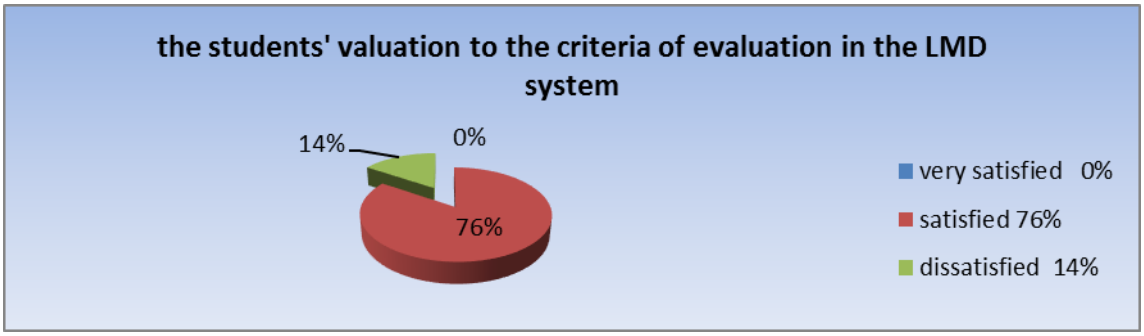
How far are you satisfied with those criteria of evaluation in the LMD system?

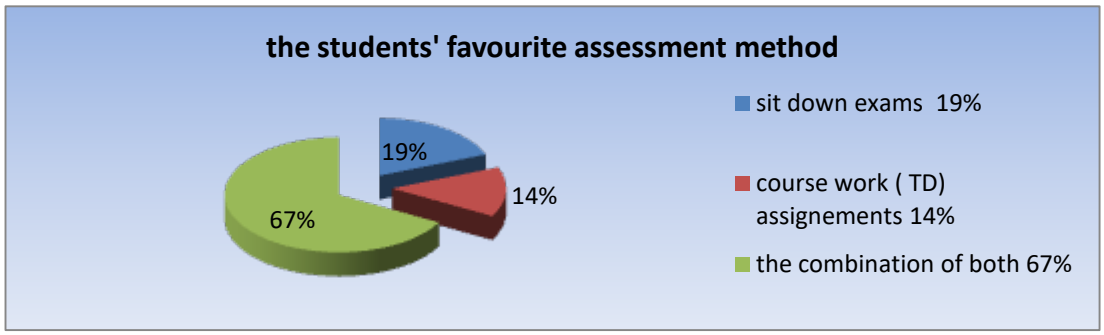
	Responses	Percentage
Very satisfied	0	0.0%
Satisfied	16	**76.2%**
Dissatisfied	5	23.8%



Which assessment method do you prefer to test your performance?

	Responses	Percentage
Sit down exams	4	19.0%
course work (TD) assignments	3	14.3%
the combination of both	14	**66.7%**

1- http://freeonlinesurveys.com/app/rendersurvey.asp?sid=w09mhfuo63owie5517595&refer=



Please decide whether you fully disagree or agree with each statement. . (Please rate from "strongly disagree" to "strongly agree).

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1-strongly disagree 2-disagree 3-neither agree or disagree 4-agree 5- strongly agree

	1	2	3	4	5
1-The tests given focus much more on the correctness of answers to generic questions	0.00%	15.00%	25.00%	**60.00%**	0.00%
2-The tests focus much more on your ability to develop and extend ideas	0.00%	19.05%	9.52%	**47.62%**	23.81%
3-The scores given tell you more about your current level and progress	0.00%	14.29%	33.33%	**42.86%**	9.52%
4- the tests given often suit your level of intellectual interests and thoughtfulness	4.76%	23.81%	2857%	9.52%	**33.33%**
5-tests set with precision of scoring set limits to discover your personal intellectual resources	0.00%	22.22%	16.67%	**44.44%**	16.67%
6-the tests set suit much more the test maker (teacher)	9.52%	**38.10%**	33.33%	19.05%	0.00%
7-the tests set suit much more the test taker (student)	0.00%	19.05%	23.81%	**42.86%**	14.29%
8-The test set suit much more the test user (administration)	21.05%	**47.37%**	21.05%	10.53%	0.00%
9-The tests correction provide helpful feedback to my answers	9.52%	9.52%	4.76%	33.33%	**42.86%**
10-As examinee , I want to question the teacher about the questions,the methods , the objectives and the results	0.00%	14.29%	19.05%	**33.33%**	**33.33%**
11- As examinee, I want to be respected by the tester	4.76%	4.76%	9.52%	9.52%	**57.14%**
12-An alternative method (testing during learning)to the one shot test can improve the efficacy that comes from cycles of model , practice , feedback and refine	5.00%	10.00%	10.00%	25.00%	**40.00%**

What is pretty encouraging is that there is quite a big number of students (52 %) who are rather informed of the LMD system. By being informed, we mean the knowledge shared among the students about the LMD evaluation criteria. Another important and apparent fact is the satisfaction of large number of students to the new system of evaluation that is based on the combination of the sit-down exams and course work (TD) assignments.Besides,a surface view of the results depicted in the above table would clearly denote a prominent number of students' views affirm that more and more selected tests' questions focus on the correctness of their answers (MCQ and other direct questions are a good instance of that).Certainly much focus on the questions' correctness rather that generic questions' pattern would set limits to the students to discover their own potentialities in the extension of ideas and their latent capacities in the different topics' analysis. Accordingly, the students seem to trust to a far extent the scores they get in their tests and exams since a good number of them (42%) confirm that such given scores tell truly about their level of progress. More importantly, the students' views converge to one shared tendency to have tests that help them extend and develop their ideas (47%) as they agree that tests set with a high precision of scoring set to discover their own potentialities and intellectual resources .Besides, a prominent number of students (42%) admit that the set test and exams suit their level which can be considered as another important gain ,too. What is seems rather praise worthy is that an important number of students (42%) admit that the tests' correction provide helpful feedback to their answers .This denotes that more and more teachers in the LMD system spend extra time in explaining to their students the missed points after any given test with the purpose to provide appropriate remedies for the spotted weaknesses. One other important depicted attitude is related to the fact that many students (66%) are not enthusiastic to get informed about the teacher's own selected objectives and methods while he or she wants to set a particular test or exam. This may be owed to the fact that students still believe that the setting of test' questions and their relevant components are typically legitimate tester's tasks and, hence, they may consider it as a sign of disrespect to "nibble" in the teacher's privacy. This interpretation is strongly supported by the attitude of the students when more than 57% expressed their disagreement to the question of whether they liked to be respected by the teacher while he or she is setting a test for them. Surprisingly, most students' views (40%) converged to their satisfaction to the one shot test rather than testing while learning that comes from cycles of model , practice , feedback and refine. One argument to such an attitude is that the one shot test can give an opportunity of sufficient preparation to get ready for it ; a chance that they would lack in testing while learning.

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Surprisingly, the questioned students showed their praise and satisfaction to the one shot test rather than the alternative method of testing (testing during learning) that can improve the efficacy that comes from cycles of model , practice , feedback and refine. Some students' comments also went for the idea that some teachers' test questions took side to the learning by heart rather than improving the students' abilities of analysis and topic development and extension. In a similar pattern of comments, other students affirmed their wish to have questions that would cover parts of the teacher's lesson explanation and not only what was dictated and written in class.. After the data collection, the discussion and analysis of the questionnaire's results, we aimed to give some other students' comments with regard to their own assessment to the LMD syetem.

4-1-Major Students' Comments on the current LMD System Assessment:

The following are some of the major depicted students' comments o and expectations of the assessments' exams , grades , tests under the LMD system:

Student(A): *"..Personally I believe, that the assessments' exams, grades, and tests under the LMD system is highly associated and vehemently depend on teachers. In other words, some teachers tests aim to develop the ability of extending ideas , improving and refining the skill of the academic and scientific analysis within learners. In this case, the grades can be considered as the correct, precise, and accurate criterion that can tell the learners about their actual level. By way of contrast; there is a host of teachers that their tests depend much more on the ability of learning by heart, and memorizing the giving information. In which, the grades are no longer a beacon that guides the learners and tells their true actual level. The bottom line is, learning process as whole (receiving data, making tests, evaluation) is done with the help of both teachers and students especially in the LMD system, we hope for the creation of teachers who can work on the critical skills of the learners."*

Student (B): " *I find exams and tests the value that examine our capacities and feedbacks of students . and the grades evaluate their answers . I wish the tests will be much more about what the teachers explained during the courses and not about what students have written on their notebooks . and the extra information given by the student should be taken as a plus to his grade ."*

Student (C) *: "We lack assessments in TDs under the LMD system because teachers are much more eager to complete the syllabus than assessing the students . Students are obliged to work hard when there are often an assessments so, it is necessary in TDs in particular .Grades do not always reflect our real levels, but rather reflect how much the student prepared for the test. Teachers' correction do not give an effective enough feedback , but only the mark the students get. Some teachers correct with giving a mark that s/he sees it is appropriate for you production especially when it comes to writing essays and paragraphs, they rather should show for the students their mistakes not to be repeated again and again .*
The exam grades tend to be logical in such a way ."

Student (D): *"well everything is perfect, concerning the exams , grades or tests under the LMD system. the nature of tests and exams suit all students regarding to their level and i really liked the idea of credits, it s very helpful. BUT what I don't like in this system is the programs , in fact I didn't feel that there is a huge difference between the classical system and this one, well I don't know how the teacher choose his own program but we approximately learn the same things that the classical students have learned , this is one thing. the second thing is the atmosphere inside the class room in fact the rooms are well equipped but there is a DARK SIDE which is the sum of students, as we know under the LMD system the room should contain at least 20 student and not exceed 35."*

With regards to the above students' views , very interesting remarks can be depicted concerning the current assessment in the LMD system. One clear view for instance blames teaches who set tests that tend to put much emphasis on the students' learning by heart and plainly claims that the tests' grades lose their value and truthfulness when they attributed to students 'answer sheets that are fully the results of learning by heart questions. In fact, such questions may be better suit the aim of the students' memory testing but not the degree of the ideas' extension and development. Another interesting view went for the importance of suggesting questions that would cover some of the teacher' s lesson explanation and not what just on ideas that were dictated and written in class. It is clear that this view supports the previous one in the sense that both of them seek some sort of questions that respect their intellectual interests and the degree of their thoughtfulness. It was another

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interesting view that one which stated clearly that the teacher's correction provided no feedback beside the given grade .He or she then insisted that the teacher should give more importance to tell the students about their real mistakes and help do some self-correction in order not to commit the same mistakes again and it is only by doing so that the grades can have a certain value. The last view expressed its satisfaction and praise to the idea of credits which is , according to him or her, is very helpful. Then he or she tries to depict some of the negative aspects of the teaching atmosphere as a whole by pointing out to the big number of students in class not before mentioning that there clear difference between the classical system and the LMD system syllabus, programmes and lessons.

It is clear that there still some of the questioned students who don't have a full dark view on the assessment process in LMD system and admit that there are some gains under this new system such as the option of credits for instance. However much talk was about the teacher's own methods of testing, questions' selection and qualitative feedback correction. The teacher is asked to set question that could test students' amount of thoughtfulness and not only test their memory capacities. Furthermore , he or she should set test that enable students to extend and develop ideas and let them discover their latent potentialities in the analysis and discussion of the different topics. Most importantly , the teacher should give more importance to provide helpful feedback to his or her students' answers. One other effective way of testing that teachers can try in their class is testing during learning. This can give chance to students to take profits of the advantages comes from cycles of model, practice , feedback and refine.

CONCLUSION

Assessment remains an essential step in the teaching process and in the student's learning life career and for a better learning there appears to be some assessment principles that need to be respected. In this respect , the students' interests shall be paramount and assessment shall be planned and implemented in ways which maximize benefits for students, while minimizing any negative effects on them. Furthermore, **.** The primary purpose of assessment shall be to provide information which can be used to identify strengths and to guide improvement. Moreover, Careful consideration should be given to the motivational effects of assessment and evaluation practices and self assessment should be considered as the appropriate starting point. Most importantly, Emphasis should be given to identifying and reporting educational progress and growth, rather than to comparisons of individuals or schools.Although the study relied only on questionnaires as unique data collection tools , a fact that did not allow for a deep understanding of both summative and formative assessment types as being implemented in the LMD system , it would raise the attention to the urgent need to review the assessment approach in order to reshape its methods to the extent that would make them suit appropriately the pedagogical requirements of the newly installed LMD sytem.

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ATOMIC NUCLEUS INTERACTIVE ELECTRONIC BOOK TO DEVELOP SELF-CONFIDENCE AND CRITICAL THINKING SKILLS

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ABSTRACT
The study aims to develop the interactive electronic school book (IESB) about the atomic nucleus for grade 12 of the last semester that can be used to develop self-confidence and critical thinking skills. The method used in this research was the ADDIE development procedure which is limited to the test phase of product design expert. Analysis data needs were taken from high school students and teachers using questionnaires. Expert tests were carried out by experts in the field of physics education. Data were analyzed quantitatively and descriptively. Based on the results of the questionnaire 65,2% of the students said that they wanted the IESB which contains an interactive question exercise with feedback for exam exercises and preparing for admission to university. The current book has not given self-confidence to 83,9% of students. Expertial test results show that the atom core electronic book that will be able to cultivate self-confidence and critical thinking skills is an interactive digital format with experimental simulation, interactive question on HOTS level with feed back, and hyperlink to other learning resources.
Keywords: critical thinking, interactive electronic book, self-confidence

INTRODUCTION

Electronic books currently used in Indonesia are static and non-interactive. Meanwhile the students' needs are electronic books that can be used independently and are interactive. Books like this will get students interested in learning physics and eager in learning, especially for physics lessons are known quite difficult and abstract. In addition, the need for books that can be used independently for the grade 12 last semester is very urgent because the grade 12 last semester has little time to study due to being pressured by time for national exams.

For example, the matter of atom core in class XII is in the even semester. Atom core is one of the physics material that discusses abstract and abstract microscopic matter in the real world that requires extra understanding. The material of the atom core includes the development of atom theory, atom core, radioactivity, and science and technology applications. It needs an interactive electronic book to help learners understanding.

One of the learning media that can be used to overcome the difficulty is interactive instructional materials in the form of electronic books. Interactive learning media can be used anywhere and anytime without teacher attendance. Thus, it is hoped that the media eliminates the learning barriers often experienced by teachers and students, especially in the learning process in the classroom and self-learning (Wu, 2016).

Based on research that has been done by Bakac et al., (2011) that learning with Computer Assisted Instruction (CAI) can improve student academic success. The activities that teachers need to implement are activities that give students the opportunity to use the technology to practice their critical thinking skills in solving a problem according to one of 21st century skills.

Having knowledge or information is not enough. Students must be able to solve problems to make effective decisions, so they must be able to think critically (Peter, 2012). This is supported by research conducted by Rosida et al., (2017) and Hussein et al., (2015), ie the effectiveness of the use of interactive e-books shows the growth of students' critical thinking skills. According to Peter (2012), the goal for educators who wish to instill critical thinking skills in a classroom is to think of students as not receiving information, but as users of information. A learning environment that actively engages students in information inquiry and application of

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knowledge will promote students' critical thinking skills. It can be suggested that critical thinking skills should play an active role in educational programs (Semerci, 2005).

This kind of learning process is no longer teacher centered, but rather leads to student centered learning. This student-centered learning enables students to improve their self-esteem, because based on the results of questionnaires approximately 83,9% of students do not have high self-esteem. Confidence is one of the supporting aspects to achieve a goal. Students who initiate their learning activities with confidence and with self-directed learning strategies will produce better achievement, because students who are not really involved in the learning process will experience shallow knowledge and low academic achievement (Yusuf, 2011). A student with high self-esteem will not give up quickly in answering the doubts it has, because believing in self-esteem will increase learning motivation (Zimmerman, 2000). This is in line with research conducted by Askar et al., (2009) that students with high self-esteem are more likely to perform challenging tasks and spend much more effort to solve them.

Based on the problems described above, the authors try to provide solutions by making interactive electronic book design on the atom core material so that students can understand the learning of physics well, foster self-confidence, and students' critical thinking skills. This multimedia learning supports student-centered learning strategies where learners take on their own responsibilities in the learning process (Teoh et al., 2007). This interactive electronic book is designed to be used by students to study independently at home, especially for XII classes whose face-to-face time at school is very narrow.

RESEARCH METHOD

The research method used is research development. The development model in this study follows a development model adapted from the ADDIE instructional design model that includes analysis, design, development, implementation and evaluation. The stages reported in this article are limited to the design of the Interactive Electronic School Book (IESB) validated by experts.

The first stage is the analysis. This analysis consists of data acquisition of requirement analysis and component component validation test. Needs analysis data were taken from 112 students and 3 high school teachers using questionnaires. Questionnaire needs analysis is done to get information about real conditions in the learning process. After obtaining the data of requirement analysis result from teacher and student, then that is doing expert validation test to atomic material material component. This validation test aims to find out the depth and breadth of the atom core material.

The second stage is the creation of interactive electronic book design. Before creating an interactive electronic book design, expert validation testing of atom core material components is required. This test is used to find out what materials should be included in the electronic book, including the form of learning resources and the type of critical thinking. Expert validation test was conducted by 3 lecturers of Physics Education, University of Lampung. Expert test results are used as a guide for making electronic book design of atom core. Expert assessment test guides are presented in Table 1.

Table 1. Expert Assessment Test Rubric

Choices	Score
Very Important	5
Important	4
Quite Important	3
Less Important	2
Unimportant	1

The instrument used has 5 answer choices. The results of the assessment are then searched average by using the formula:

$$Assesment\ Score = \frac{total\ score}{total\ of\ expert}$$

Once obtained the average is then converted to a grading statement to determine which material should be present in the IESB atomic nucleus.

The results of this conversion is obtained by conducting a descriptive analysis of the scores obtained. The conversion of the score to this assessment statement can be seen in Table 2.

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Table 2. Assesment and Decision Score

Average Score	Decision
4,20 – 5,00	Very important to be put in atomic core IESB
3,40 – 4,19	Important to be put in atomic core IESB
2,60 – 3,39	Quite important to be put in atomic core IESB
1,80 – 2,59	Less important to be put in atomic core IESB
1,00 – 1,79	Unimportant to be put in atomic core IESB

RESULT OF DEVELOPMENT AND DISCUSSION

The main result of the development research that has been done in 3 high schools in Metro City is the IESB design of atom core to foster self-confidence and students' critical thinking skills. Prior to making the design in advance conducted expert validation tests on atom core component materials. Expert tests were conducted by three physicists. Expert test results are shown in Table 3.

Table 3. Expertial test result of atom core component materials

Study Materials	Component Materials	Average Expertial Test Result	Information
Atomic Theory	Atom Dalton Concept	3,67	Important
	Atom Dalton Image	3,67	Important
	Atom Thomson Concept	3,67	Important
	Atom Thomson Image	3,67	Important
	Thomson's Experimental Scheme Image	3,67	Important
	Milikan's Experimental Image	3,67	Important
	Atom Rutherford Concept	3,67	Important
	Atom Rutherford Image	3,67	Important
	Atom Bohr Concept	4,00	Important
	Atom Bohr Image	4,00	Important
	Atom Hidrogen Concept	4,00	Important
	Atom Hidrogen Formula	4,00	Important
	Electron Transition Animation	4,00	Important
Atomic Nucleus	Atom Structural Concept	4,00	Important
	Atom Structural Image	4,00	Important
	Core Stability Concept	4,33	Very Important
	Core Stability Graphical Image	4,00	Important
	Defek Massa Concept	4,33	Very Important
	Defek Massa Formula	4,33	Very Important
	Binding Energy Concept	4,67	Very Important
	Binding Energy Formula	4,67	Very Important
Radioactivity	Alpha Rays Image in Magnetic Field	4,00	Important
	Alpha Rays Concept	4,33	Very Important
	Alpha Rays Translucency Image	4,00	Important
	Beta Rays Image in Magnetic Field	4,00	Important
	Beta Rays Concept	4,00	Important
	Beta Rays Translucency Image	4,00	Important
	Gamma Rays Image in Magnetic Field	4,00	Important
	Gamma Rays Concept	4,00	Important

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Study Materials	Component Materials	Average Expertial Test Result	Information
Science and Technology Application	Gamma Rays Translucency Image	4,00	Important
	Radioactive Activity Concept	5,00	Very Important
	Radioactive Activity Formula	4,67	Very Important
	Radioactive Age Determination Simulation	4,67	Very Important
	Alpha and Beta Particles Decay Simulation	4,67	Very Important
	Alpha and Beta Particles Decay Video	4,67	Very Important
	Part-time Concept	4,67	Very Important
	Part-time Formula	4,67	Very Important
	Geiger Muller Working Enumerator Scheme Principle	4,00	Important
	Geiger Muller Enumerator Scheme Image	4,00	Important
	Wilson's Fog Room Working Principle	4,00	Important
	Wilson's Fog Room Image	4,00	Important
	Radiation Hazards Image	4,33	Very Important
	Radiation Hazards Video	4,33	Very Important
	Radiation Source Diagram Image	4,33	Very Important
	Fission Reaction Concept	5,00	Very Important
	Fission Reaction Image	4,33	Very Important
	Fission Reaction Simulation	4,67	Very Important
	Fission Reaction Video	4,67	Very Important
	Nuclear Reactor Video	4,33	Very Important
	Fusion Reaction Concept	4,67	Very Important
	Fusion Reaction Image	4,33	Very Important
	Radioisotope Benefits Concept	4,33	Very Important
	Radioisotope Benefits Image	4,00	Important

Based on expert test results it is found that important concepts are displayed in all chapters and sub sections, this concept contains the elaboration of the atom core material and these concepts are interrelated. By understanding the basic concepts of atom theory and atom structure, it is easier to study advanced conceptual materials such as radiation and core reactions. Then there are some suggestions given by the expert on the concept that, on the matter of atom theory should use a physics approach. For example explaining the cause of electrons do not fall when it surrounds the core.

Physics lessons also can not be separated from the use of formulas to solve the problem. This book presents formulas on the material of hydrogen atoms, mass defects, binding energy, radiation activity, and half-life. This book also contains the working principle of a radiation detector device. This is important raised because the radiation detector is still very layman in the eyes of students. Given this working principle students can get an idea of how radiation detectors work, such as the Geiger Muller counter and Wilson's fog room.

Besides containing concepts, formulas, and working principles, this book also features images, animations, simulations, and videos. This is because the material of the atom core is a very abstract material. Thus, to eliminate abstraction in the students then made a visualization in the form of images, animation, simulation, and video. Videos, images, text, animations, and sounds can be more contextual learning (Suartama, 2010).

The materials that display images are atom theory, core structure, core stability graph, radioactive ray, radiation detector, radiation source, core reaction, and radioisotope. Drawings are able to help students illustrate abstract material that students can not see visually. This is in line with research conducted by Agustina et al., (2017) that, still images can explain a concept concretely and realistically. Picture able to support existing material concept. Based on research conducted Herrlinger et al., (2017) showed that, the picture improves learning outcomes.

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Furthermore, it is animation. Animation is important on electron transition material. So students get an idea of how the electrons move the trajectory. Flash animation for learning technology can be used as a help in understanding the concept and to improve students' thinking more effectively. Agustina et al., (2017) and Anggraini et al., (2017) say that the use of motion picture media/animation can improve student learning outcomes. Flash animation is able to analyze existing concepts and can provide ideas that connect students with a basic understanding of new knowledge. Findings of Salim et al., (2015) shows that learning by using flash animation can help students in comprehending abstract lessons significantly.

Simulations on radioactive material, fission reactions, and radioisotope benefits are essential. Simulations in learning can describe something complex or complex to be explained with only images and words only. This is in line with Moore et al., (2014), that the PhET simulation provides dynamic access to multiple representations, makes invisible ones visible, aids in investigations, and enables quick and secure access to multiple experiments, and makes students' fun excitement and teachers.

According to expert test results, a video on science and technology applications (fission reactions and nuclear reactors) is very important to display. Nuclear reactions do not always pose a danger like nuclear bombs, but there are also benefits such as power generation and are also used in some industrial processes in the future. This is in line with Permana (2005) and Alimah et al., (2008) that nuclear energy generated in a nuclear reactor is utilized into electrical energy that can be a competitive contributor with other electrical energy sources such as coal, oil, gas, water, and others. It also features alpha and beta particle decay videos, as well as radiation hazards. Ljubojevic et al., (2014) states that integrating video clips in multimedia lecture presentations can improve students' perceptions of important information and motivation to learn. Therefore, students can better understand and remember the subject of the lecture. So even with the study of physics, students more easily understand what is learned by looking at the video material. Video is also able to increase students' interest in studying difficult material like the material of this atomic nucleus. This is in accordance with Suartama (2010) that videos can stimulate more senses. Through the video can be displayed things or real events related to the material learned so that students more easily understand the material.

Having obtained the results of expert test component atomic material, then create an electronic book design design interactive atom core. Figure 1 is an interactive electronic book design drawing of atom core.

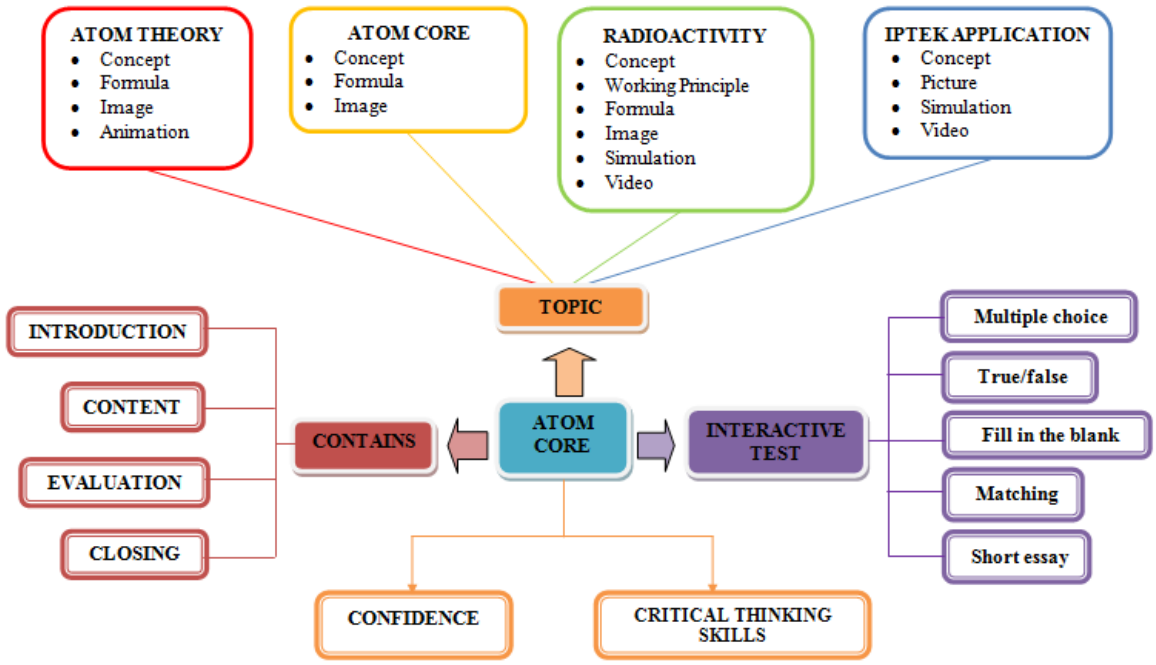

Figure 1. Atom Core Interactive Electronic Book Design

This interactive electronic book is designed to foster students' critical thinking skills. The book comes with interactive questions at the High Order Thinking (HOT) level that comes with feed back and hyperlinks to other learning resources. High order thinking involves the transformation of information and ideas. This transformation occurs when students combine facts and ideas and synthesize, generalize, explain, hypothesize or arrive at some conclusions or interpretations. Manipulating information and ideas through this process allows students to solve

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problems, gain insight, and discover new meanings (Ramos et al., 2013). HOT is the best teaching and learning technique in real-world context and by varying scenarios students can use their newly acquired skills, so HOT is very important for the quality of education (Mainali, 2012).

The interactive questions are multiple choices, true/false, fiil in the blank, matching, dan short essay. Interactive questions are used to determine the level of mastery of the material and the achievement of basic competence of each material. Wallace et al. (2015) says that the analysis of the value of the final exam proves the effectiveness of exercises to improve students' critical thinking skills. An interactive e-learning environment that not only generates generic skills such as critical thinking, analytical reasoning, problem solving, and written communication (Chellamani, 2014).

In addition to growing students' critical thinking skills, this interactive electronic book is also able to foster students' confidence. This is in line with research conducted by Alshaya et al., (2017) on the effectiveness of e-books and their confidence in using them. The results show that students have the basic skills necessary to download and read e-books and utilize their characteristics, they also believe in their usefulness and are satisfied with it so that they intend to continue using e-books in the future. Another study by Kissinger (2013) states that students are able to have high confidence when using e-books.

In addition to prioritizing the content of the material, this interactive electronic book also prioritizes how it looks. This is intended to get students interested in using electronic books. Through interactive books students can learn in a fun way and acquire new skills (Solcova et al., 2016). As research conducted by Kao et al., (2016), that interactive e-book models should display attractive art designs and not only contain simple interactive buttons that will improve students' reading performance.

CONCLUSION

IESB is an atom core that can foster self-confidence and students' critical thinking skills. IESB contains concepts, working principles, formulas, images, animations, simulations, and videos. IESB atom core is also equipped with interactive questions at HOT level along with feed back and hyperlinks to other learning resources. The interactive question are multiple choices, true/false, fiil in the blank, matching, dan short essay.

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CHARACTERISTICS OF STUDENTS' CRITICAL THINKING IN SOLVING MATHEMATICS PROBLEM

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ABSTRACT
The purpose of this study was to describe critical thinking process of students in solving mathematical problems based on the framework of Polya. Therefore, this study classified as a descriptive qualitative research. These research subjects were 32 junior high school students of grade 7. The data collection begins with students solving mathematical problems about geometry (trapezoid). If in the process of completion, students experiencing the critical thinking they would be selected as the subject of study and further their thinking process explored. The occurrence of critical thinking in students characterized by the student's behavior that constructs and evaluate the strategies used to solve the problem. The results showed that the students' critical thinking process in solving mathematical problems with the framework of Polya include low critical thinking, medium critical thinking, and strong critical thinking.
Keywords: critical thinking, mathematics problem, critical thinking based framework polya

INTRODUCTION

Some researchers have investigated the importance of thinking in mathematics learning. From these results obtained characteristic mistake of students' thinking in constructing mathematical concepts (Subanji & Nusantara, 2013); refractive thinking characteristics of college students in solving mathematical problems (Prayitno, 2016). Thinking process is a mental activity undertaken by college students in problem-solving and can be seen by appeared behavior as the result of task completion (Prayitno, 2015, 2016). Mathematics learning problems in school are complex. Students find many problems associated with the real context. By the time students are given complex mathematical problems, students will sometimes experience confusion so enable the students to get to know the problem. On the other hand, students will identify the necessary materials so that they can find ways/strategies used to handle the problem. Furthermore, students will connect and evaluate the strategy to generate conclusions. Some of the completion strategy produced by the students is a single strategy, a dual strategy and multi-strategy (Prayitno, 2015; Prayitno, Subanji, & Muksar, 2016). Completion strategy created by the students often reflect the way students' thinking. Therefore, students' thinking skills in solving mathematical problems need to be explored.

In mathematics learning, teachers need to emphasize in thinking, communicating or making decisions. If the ability which required is only reading, writing and calculating ability (*calistung*) or emphasis on procedural ability (calculating in solving problems), then our students will be more concerned with the final outcome of the process. They might even ignore reasoning, thinking, communicating and deciding ability. The importance of students to think has been seeded in one of the mathematics learning objectives that are to train how to think and reason in drawing conclusions through research, experiment, showing similarities, differences and consistencies and inconsistencies (Depdiknas, 2006). In addition NCTM (2000) formulate mathematics learning objectives namely: (a) learn to communicate (mathematical communication), (b) learn to reason (mathematical reasoning), (c) learn to solve problem (mathematical problem solving), (d) learn to connect the idea (mathematical connections), and (e) forming positive attitudes towards mathematics (positive attitudes toward mathematics).
The thinking process occurs when a person is given a complex issue, it's likely someone will clash then the person needs to carry out investigations to produce a solution to the problem. According to (Prayitno, 2016) thinking is a mental activity performed by students to solve problems and can be seen from their behavior in form of assignment completion result. In addition, the opinion (Krulick & Rudnick, 1995) states that thinking can be divided into four categories, namely recall, basic, critical thinking and creative thinking. Therefore, this study examines the critical thinking process.

Students' ability in explaining concepts in their own words is evidence that students experiencing critical thinking (Choy & Cheah, 2009). Some experts define critical thinking is a thinking process that aims to make decisions rationally which is directed to make a decision (Ennis, 1996; Facione, 2015; Jenicek, Croskerry, & Hitchcock, 2011; Krulick & Rudnick, 1995; Lai, 2011). In this case, critical thinking is focused in terms of something that leads to a goal. The purpose of critical thinking finally enables to make decisions. In accordance with Choy & Oo (2012) explains that critical thinking is the process of analyzing and making judgments about

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what has happened. Pressure on the word "make judgments" were revealed in the definition explicitly states that the decision is part of critical thinking. In addition, Ennis (1996) revealed that critical thinking is thinking rationally or based on reasoning that is focused on deciding what to believe or do. From these definitions, it can be revealed a few things. First, critical thinking is thinking rational (reasonable). Second, critical thinking is also an activity that focused. It shows that a person not only thinks but in thinking about something, someone wants to understand fully. Third, critical thinking is to consider and evaluate information in a way that finally enables one to make a decision. Some decisions must be based on information known to or derived from what is known.

Based on the view of Pagano & Roselle (2009), critical thinking is a process of evaluating the relevant information and opinion collected in the phase of reflection in a systematic, purposeful, efficient way to develop problem-solving skills. The evaluation revealed Pagano & Roselle (2009) is a form of evaluation of various alternative information or settlement obtained from the reflection. In addition, also, Fisher (2001) reveal that critical thinking is characterized by the activity of skilled interpretation and evaluation of the information and statements. The various definitions of critical thinking revealed by experts contain many similarities. if the opinion of several experts (Fisher, 2001; Pagano & Roselle, 2009) equated or compared, it gained critical thinking component, namely the construction and evaluation (Prayitno, 2016), hereinafter, the component is used as an indicator of critical thinking in the study. Construction activity is characterized by constructing solving strategies needed to lead to an answer, while the evaluation characterized by the process of selecting a solving strategy or answers. The selection process is based on a consideration if there is equality of information. Therefore, critical thinking in this study is thinking the process that is characterized by constructing and evaluating the strategy and the most appropriate answer based on considerations (Prayitno, 2015, 2016).

To be able to explore critical thinking, the thing that needed is knowledge on how to portray students' thinking (Prayitno & Suarniati, 2017). A cognitive map is a technique for representing how the subject thinks about a certain problem or situation so that researchers can have a certain attitude for the next step (Ackermann, Eden, Cropper, & Cropper, 2004). Some researchers explore students' thinking by using a cognitive map (cognitive map), including Subanji & Nusantara (2013) using a cognitive map to explore students' mistakes in constructing mathematical concepts. Perdikaris (2011) uses the term cognitive style or thinking style that is used as a mediator to the students' work in solving geometry problems with the theory of Van Hielle, Jacobs, & Schenk (2003) showed that cognitive maps can be used as a guide to get to the next step in order to obtain directions to think further. Moreover, Pena, Sossa, and Gutierrez (2007) revealed the results of studies showed that cognitive map can describe the causality of phenomena and concepts also can be modeled. Therefore, students' critical thinking process in solving mathematical problems can be explored by using a cognitive map.

Critical thinking process can be used to solve mathematical problems. In solving the problem, students can uncover problems solved. In this case, enabling students to understand the problem. Based on this understanding, students devise problem-solving strategies. in strategic planning, students can find the right ideas or solutions that enable the effective strategies to solve the problem. The right idea or solution can be obtained if critical thinking is used in solving the problem (In'am, 2014). Polya (1973) revealed that problem-solving is identified as the ability to (1) understand the problem, (2) plan, (3) implement the plan and (4) checking back. Therefore, the objective of this study is to describe the process of critical thinking of students in solving mathematical problems based on the framework of Polya. The purpose of this study was to describe critical thinking process of students in solving mathematical problems based on the framework of Polya. The established hypotheses were: (1) their differences on the subject of critical thinking, and (2) critical thinking characteristics include strong critical thinking, medium critical thinking, and low critical thinking.

RESEARCH METHODS

Participants

The approach and type of research are qualitative descriptive. This study examines the students thinking the process in solving mathematical problems based on the framework of Polya portrayed through a cognitive map. Subjects were junior high school students of grade 7 of Malang regency.

Instruments

This research instrument, in the form of story problems on geometry (trapezoid) based on the curriculum used in junior high school. The instrument is presented in Figure 1 below.

An isosceles trapezoid-shaped garden with the alignment of the long sides $(x + 4)$m and $(3x + 2)$m. If the distance between the two parallel lines $2x$ m and the area is 180 m^2, What is the perimeter of the garden?

Figure 1. The research instrument

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Procedure

Data collection began with giving an instrument to the students to be solved with a time of 20 minutes by raising their voice. This method is known as *think aloud* (Samkof, Lai, & Weber, 2012). After students obtain the solution, researchers verify the completion process of students to obtain answers. If students are experiencing critical thinking (marked by constructive and evaluation activities) in completing the instrument then used as subjects. If there is a mismatch between what is revealed and what is written, the researchers conducted interviews for further investigation. Furthermore, the results of these interviews are used to describe of students' critical thinking process in solving mathematical problems.

Data Analysis

The results of the data collection are the work of students and think aloud interviews and field notes were analyzed based on the stage developed by Creswell (2009).

RESULTS AND DISCUSSION

The number of subjects in this research was 51 students, there are 17 students experience critical thinking is low, 23 students experience critical thinking is medium, and 11 students experience critical thinking is strong. The results of students' critical thinking in solving mathematical problems are presented in Table 1.

Table 1. The Results of Students' Critical Thinking In Solving Mathematical Problems

Critical Thinking		
Low	Medium	Strong
17	23	11
33%	45%	22%

The Analysis Thinking Process of Subject 1 (S1) To Solve Problem

The thought process S1 begins with the, S1 read the questions repeatedly. In this case, the students understand the problem. students understanding shown by the students draw a trapezoid. After describing the trapezoid, students looked at the question again and wrote what about they know on the matter and wrote it by the side of the trapezoid. Students wrote parallel sides $(x+4)$ and $(3x+2)$. While the distance of parallel side $2x$ like as a high and wide trapezoid is 180. In this case, students are able to understand the garden problems by digging information on the matter and to represent it in the form of a trapezoid image.

The next process, S1 began to devise a plan to solve the problem. The first plan created is constructing parallel sides containing variables. This construction is used to indicate which side is unknown. In this case, S1 trying to find any parallel sides and high trapezoid. Furthermore, S1 find the value of x with wide trapezoid $L = \frac{(a+b)}{2}.t$. At the time S1 planned to look for the value of x, through a broad trapezoid there will be construction process value x with the operation of algebra. The construction obtained S1 to factoring. In this case, S1 undergoing construction thinking when planning to determine the value of x.

In the second plan, S1 replaces the variable x with the results obtained. In this case, S1 performed evaluation process to obtain a length trapezoid. S1 thinking back to search perimeter a trapezoid. Perimeter trapezoid is determined by summing the length of the side trapezoid, but there is one side unknown the value. S1 presume that one side of the unknown trapezoid can be found using the Pythagoras concept. This indicates that S1 evaluating several strategies appropriate to look for one side of the trapezoid. preparation of plans by S1 is shown by the results of his think aloud "*Ehh* .. (pause and look at the trapezoid), *there remain the unknown size is oblique side, it could have sought with Pythagoras* (refer to the image)". In this case, S1 undergoing a process of critical thinking when crafting a strategy or plan for a solution the problem.

Under the plan, S1 began to write comprehensive trapezoid $L = \frac{(a+b)}{2}.t$. S1 replace a with $x+4$ and $b$with $3x+2$. In addition, S1 replaces L with 180 and t with $2x$. S1 uses distributive properties to determine the value of *x*. Following the results of S1 using distributive properties.

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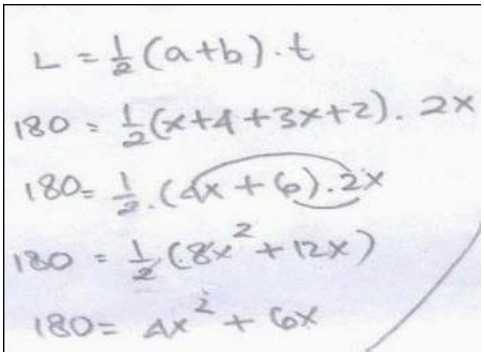

Figure 2. The Work of S1 Using Distributive Properties

The next process, S1 evaluating $4x^2 + 6x = 180$. S1 uses the concept of factoring to determine the value of x. furthermore, S1 simplifying thus obtained $2x^2 + 3x - 90 = 0$. Form of the equation $2x^2 + 3x - 90 = 0$ if factored so $(x + 6)$ and $(2x + 15)$. Of these factors, obtained the value of *x*. Here are the results of the students working to determine *x*.

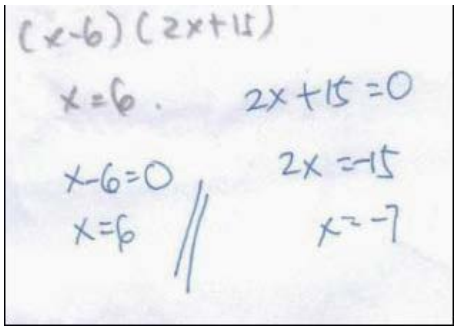

Figure 3. The Work of S1 When Factoring

From the results of the above work, the value of *x* is *6* and *-7*. S1 returned to the evaluation process of the value of *x*. S1 select *6* qualified for the value of *x*, it is due to positive numbers can express the length of a side. The following excerpts of an interview with a researcher S1.

P : *What do you mean about 6*
S1 : *Cause as qualified for the length of the side is a number which is a positive value.*

The next process S1 substitution *x= 6* on parallel sides and high of the trapezoid. By the time students substitution *x = 6* on parallel sides and high of trapezoid occurred construction process in critical thinking S1. S1 continue the process of determining the hypotenuse. The students began to think, "hypotenuse using the Pythagoras theorem". The next S1 uses the concept of Pythagoras when looking for the hypotenuse of a trapezoid.

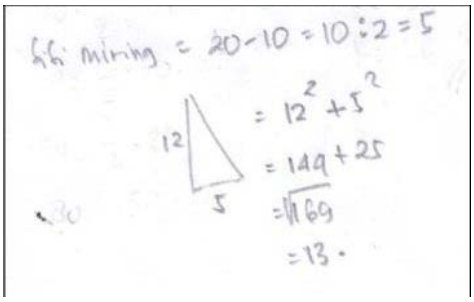

Figure 4. The Work of S1 Using Pythagoras Concept

All sides of the trapezoid are already in to know, so S1 carry out the next plan is to calculate the perimeter of the pool which is trapezoid in shape. S1 see elements that were asked, S1 see the images back and look at the result of the substitution of the sides of the trapezoid to calculate the perimeter of a trapezoid "for all sizes of the sides has been found then calculate its perimeter by summing all sides of the trapezoid". This is the process of construction in the process of critical thinking. The process of the student to check his work by reading back in the matter, then look back at the known and asked, looking back at his work carefully, it is a process of

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evaluating the students critical thinking. S1 substitution value of x on the side and high of the trapezoid, then it substitution to the trapezoid area. When the trapezoid area worth *180*, so the resulting answer is true and correct. Therefore, S1 classified into strong critical thinking. Following the results work S1 when checking back.

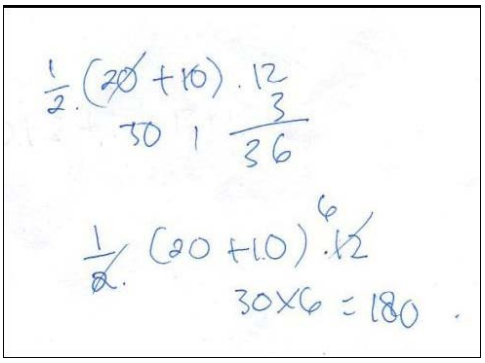

Figure 5. S1 when checking back

The Analysis Thinking Process of Subject 2 (S2) To Solve Problem

S2 began to read about repeatedly. S1 begin to understand the problem. Afterward, S2 can be shown what is known and who asked the question. Here are the results of the work in stages S2 understand the problem.

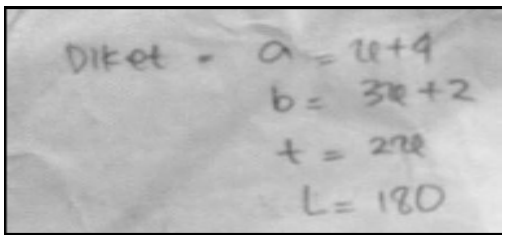

Figure 6. The Work of S2 When Understand the problem

After understanding the given problem, then S2 plan to problem-solving the given problem. The composition of the S2 plan made is to find the value of x through broad the trapezoid$L = \frac{(a+b)}{2}.t$. In this case, S2 used trapezoid area formula for determining the value of x. In this process, S2 make the evaluation process of the strategy that will be used to resolve this problem. The value of *x* is found later on substitute into the parallel sides and high of a trapezoid. This process is known as the process of constructing the value of *x* to get the length and side of the trapezoid. Here, the results of think aloud S2 when doing the planning strategy "*looks like, should have to sought the value of x first. The value of* x *can be obtained by using the formula trapezoid. then substitute to each side of the trapezoid, the next step is determined perimeter the trapezoid of the value of x?*

The results statement from S2, clarifying that the value of x then can be used to determine the perimeter of a trapezoid. In this case, S2 can do the planning of the strategy that will be used to determine the perimeter of a trapezoid. The next process, S2 begin to resolve the matter based on plans that have been prepared. S2 began to write the formula $L = \frac{(a+b)}{2}xt$. S2 operate the wide of trapezoid to determine the value of x. when doing completion, S2 encountered an error in operating the$\frac{(x+4+3x+2).2x}{2}$. S2 indicates that the result $\frac{(x+4+3x+2).2x}{2}$ is $4x + 6x$. however, the completion which is considered S2 one seems to have improved. This, due S2 reflect on the results of his work. The next step, S2 perform factoring towards completion.

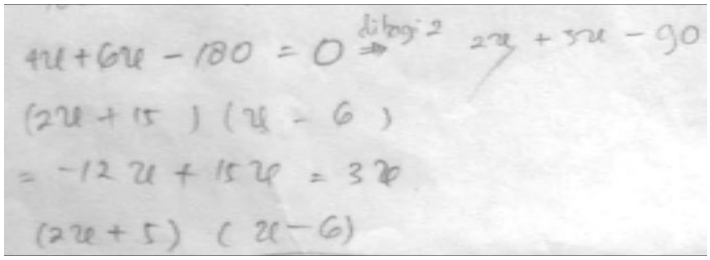

Figure 7. The Work of S2 When Factoring

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At the time the construction process occurs factoring in critical thinking, but the criticality of its low because by the time he was factoring $2x + 3x - 90 = 0$ the result is incorrect. while $(2x + 5)(x - 6)$ is a factor of $2x^2 + 3x - 90 = 0$. This shows that the S2, experienced a low critical thinking when solving problems.

P : *Are you confident with the results?*
S1 : *Tough back in the settlement (Oh yes, I forgot to write his rank second sir, so in this equation is no rank. So the result is this factor ".*

The interview results showed that the S2 experienced reflective thinking. In this case, S2 wrong in writing but when the researchers questioned the results of its work, S2 understand the fault location and repair it. The value $x = 6$ were then substituted on the high side and the parallel trapezoid. so that each side acquired *10* and *20*. While high of the trapezoid is *12*. Then S2 continue the next plan is to look for the hypotenuse. The students began to think back and remember the Pythagoras theorem. The next S2 uses the concept of Pythagoras, when looking for the hypotenuse of a trapezoid.

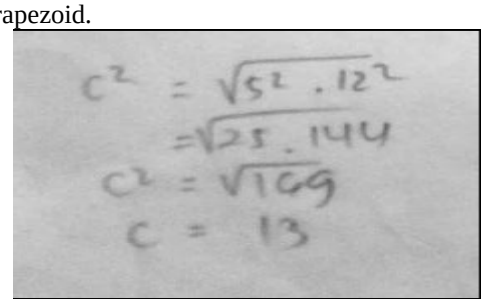

Figure 8. The Work of S2 Using Pythagoras Concept

Based on the hypotenuse, S2 can determine the perimeter of a trapezoid. Roving trapezoid is *10 + 20 + 13 + 13 = 56*. In this case, S2 can solve the problem of the trapezoid (geometry). The next step the S2 is to re-examine his work is read back the matter, then look back at the known and asked, looking back at his work carefully, it is a process of evaluating the student's critical thinking. Therefore, S2 is classified into low critical thinking.
S2 began to read about repeatedly. S1 begin to understand the problem. Afterward, S2 can be shown what is known and who asked the question. Here are the results of the work in stages S2 understand the problem.

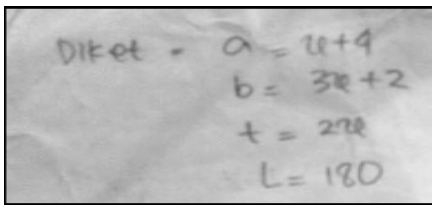

Figure 6. The Work of S2 When Understand the problem

After understanding the given problem, then S2 plan to problem-solving the given problem. The composition of the S2 plan made is to find the value of x through broad the trapezoid $L = \frac{(a+b)}{2}.t$. In this case, S2 used trapezoid area formula for determining the value of x. In this process, S2 make the evaluation process of the strategy that will be used to resolve this problem. The value of *x* is found later on substitute into the parallel sides and high of a trapezoid. This process is known as the process of constructing the value of *x* to get the length and side of the trapezoid. Here, the results of think aloud S2 when doing the planning strategy "*looks like, should have to sought the value of x first. The value of* x *can be obtained by using the formula trapezoid. Then, substitute to each side of the trapezoid, the next step is determined perimeter the trapezoid of the value of x?*

The results statement from S2, clarifying that the value of x then can be used to determine the perimeter of a trapezoid. In this case, S2 can do the planning of the strategy that will be used to determine the perimeter of a trapezoid. The next process, S2 begin to resolve the matter based on plans that have been prepared. S2 began to write the formula $L = \frac{(a+b)}{2}xt$. S2 operate the wide of trapezoid to determine the value of x. when doing completion, S2 encountered an error in operating the $\frac{(x+4+3x+2).2x}{2}$. S2 indicates that the result $\frac{(x+4+3x+2).2x}{2}$ is $4x + 6x$. however, the completion which is considered S2 one seems to have improved. This, due S2 reflect on the results of his work. The next step, S2 perform factoring towards completion.

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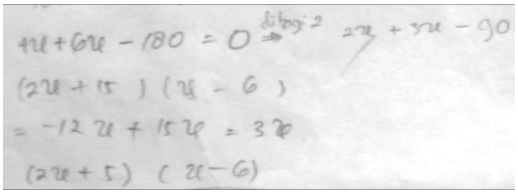

Figure 7. The Work of S2 When Factoring

At the time the construction process occurs factoring in critical thinking, but the criticality of its low because by the time he was factoring $2x + 3x - 90 = 0$ the result is incorrect. while $(2x + 5)(x - 6)$ is a factor of $2x^2 + 3x - 90 = 0$. This shows that the S2, experienced a low critical thinking when solving problems.

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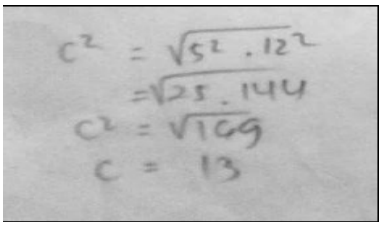

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The Analysis Thinking Process of Subject 3 (S3) To Solve Problem
The process critical thinking of S3 begins with manufacture a trapezoid image and write the parallel sides *(x + 4)* and *(3x + 2)* and the high is *2x*. In this case, S3 represents a garden problem with trapezoid and the elements are known. The next process, S3 settlement plan by first determining the value of x that side of the trapezoid can be known. S2 suspect that one side of the trapezoid can be obtained from the trapezoid area and Pythagoras. This is shown by the results of *think aloud S2 "hmm ..advance determined side and height. It can be searched by trapezoid area and Pythagoras".*

The next process, S3 began to devise a plan to solve the problem. At this stage, S3 identifies that the parallel side alignment of an element x and the long sides are unknown. S3 seem to think that to determine the value of x based on the high and the parallel side of trapezoid required the wide of trapezoid$L = \frac{(a+b)}{2}.t$. When students are planning to look for the value of *x*, with anwide of a trapezoid so the algebra operation process will occur until the factoring of algebraic form. In this case, S1 is able to plan well when looking for value *x*.

Under the plan, S3 began to appear to write $L = \frac{(a+b)}{2}.t$. S1 looks associate with known elements trapezoid area. this continues until the operation process algebra and obtain $4x^2 + 6x = 180$. S3 looks reshaped the equation $4x^2 + 6x = 180$ to $4x^2 + 6x - 180 = 0$. Based on the general pattern $ax^2 + bx + c = 0$. After that, S3 factoring $4x^2 + 6x - 180 = 0$ by considering the concept of factoring and dividing both sides by *2* to obtain $(2x + 15)$ and $(x - 6)$. These factors, the value of *x* is obtained. Here are the results of the students' work in determining *x*.

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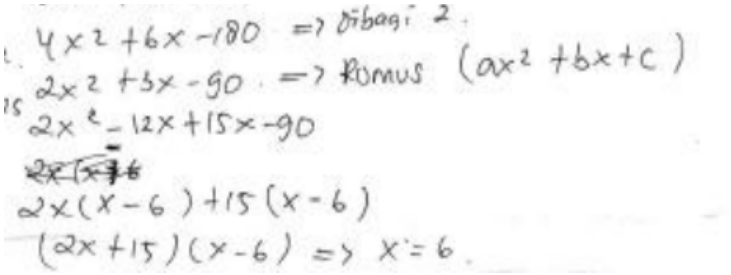

Figure 9. The Work of S3 When Factoring

From above the results work, the value of *x* is *6* and *-7*. From the above results, these students choose the positive value because it is more qualified to determine the value of *x*. The following excerpts of an interview with a researcher S3.

P : *This keeps why 6 that you use as the value of x and not -7.5?*
S1 : *Because as eligible for the length of the side is a number which is positive.*

The next process S3 substitution *x = 6* on parallel sides and tall trapezoid. By the time students substitution *x = 6* on parallel sides and high on trapezoid occurs construction process in critical thinking S1. S1 continue the process of determining the hypotenuse. The students began to think back and remember the Pythagoras theorem, *whether by using the Pythagoras theorem, his side will be found ?*. By the time the students had occurred the evaluation process of the completion strategy. Following the work of S3 by using the Pythagoras concept when looking for the hypotenuse of a trapezoid.

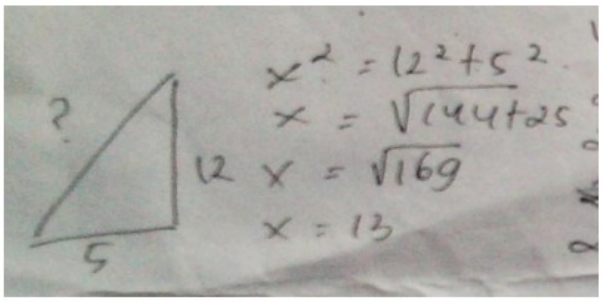

Figure 10. The Work of S3 Using Pythagoras Concept

Since all sides of the trapezoid is already in the know, then S3 executing the next plan is to calculate the perimeter of the pool which is trapezoid in shape. S3 see elements that were asked, S3 see the images back and see the results of the substitution the sides of the trapezoid to calculate the perimeter of the trapezoid *"The next step is for all sizes of the sides has been found then calculate its perimeter by summing all sides of the trapezoid"*. This is the construction process in the process of critical thinking. In determining the perimeter, there are mistakes made by S3 that when summing all sides, but this does not affect the process of completion. Here are the results of the answers S3 when determining the perimeter of a trapezoid.

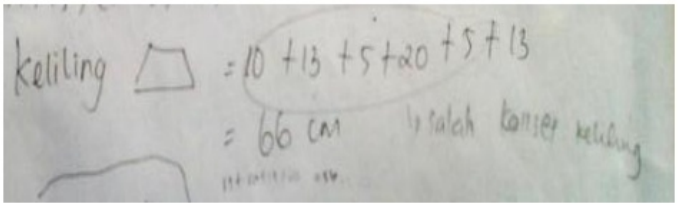

Figure 10. The Work of S3 When Determine Perimeter

The process of the student to check his work by reading back the question, then look back at the known and asked, looking back at his work carefully, it is a process of evaluating the student's critical thinking. S3 substituting the value of *x* on the side and high the trapezoid, then substituting in the trapezoid broad. When the broad of the trapezoid are valuable *180*, then the answer is true and correct. Therefore, S3 is categorized into medium critical thinking. Following the work result of S3 when checking back. From the above analysis, the process of student's critical thinking in solving mathematical problems based framework Polya as follows.

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Understanding the Problem: Subjects who understand the problems that S1 and S3. The both subjects can identify elements that are known and asked. The both subjects are also able to interpret the problem in the form of pictures, as well as the two subjects, were able to make a hypothesis or conjecture. While S2 only able to identify the elements that are known and asked. In the process of construction has not been seen on problem-solving.

Make Plan: In making plans to solve the problem, three subjects were able to make the good plan. It is shown that all three subjects read back problem, read back the elements that are known and asked, analyze the problems with the plans to be made and continue the next plan.

Implement Plan: In the process of implementing a plan, S1 was very thorough and the final result obtained is also true. S2 is able to describe the back matter. S2 is less rigorous because of an error in the algebra operations analysis but the end result is obtained correctly. The results obtained properly, and lack of the evaluation of critical thinking because they do not read back the completion of the first plan. S3 less scrupulous when calculating the perimeter so that the final result obtained was wrong.

Checking Back: S1 and S3 were able to prove the truth of the answers that he obtained by identifying the elements that are known. The both of these subjects were able to prove to correct the trapezoid broad in accordance to given problems. S2 was not able to prove the truth of the results obtained.

CONCLUSION

Based on the analysis concludes that the critical thinking process is classified into three, namely low critical thinking, medium and strong. Strong critical thinking is characterized by the formation in the form of the data and the facts are clear, precise, thorough and relevant and resolving problems with the viewpoint of a clear and comprehensive. Low critical thinking is marked with information such as data and facts obtained from about less conscientious and less relevant and able to solve the problem with a clear viewpoint and limited. Medium critical thinking marked with information such as data and facts obtained from the less scrupulous about the final results and was able to resolve the problem with a clear viewpoint and limited.

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IS A COMMON PERSPECTIVE OF LANGUAGE AS HUMAN INNATE NATURE WORKABLE IN EDUCATION? UG PERSPECTIVES AND ROLE OF INSTRUCTION IN SLA

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ABSTRACT.
This paper discusses how the theory suggesting human innate nature of language acquisition would positively be applied in ES/L education. In SL/FL education, Universal Grammar (UG) and the critical period hypotheses have some recognition as a part of common sense. This paper, therefore, reviews the concept of UG and surrounding research history and debate, including a position of the language myth, briefly, and considers how this concept is applied to more effective learning. This paper shows discussions on a possibility of UG existence, UG Accessibility hypothesis, and its application in SLA instruction.
Keyword: universal grammar, accessibility hypothesis, SLA, instruction

INTRODUCTION

In SLA, some believe that humanity has the innate ability to acquire languages, and those who especially believe that human beings have a special mechanism for language learning independently, which is embodied in the concept of Universal Grammar (UG) hypothesis, are called special nativists (Gass & Selinker, 2001). UG is innate biological properties that possess a set of language principles (White, 1998). In real practice, whether English educators or even learners know the technical words of UG or relating terms such as the critical period hypotheses, many have some sense on such intuition of language learning, as the widespread of a story of Amala and Kamala as an example case of critical period (but, as you know, this story is not a true, refer to Aroles, 2007). Therefore, it will be meaningful to review how this concept defines and applied in the SLA field.

The term Universal Grammar was proposed by Chomsky (1957) in answer to "'Plato's problem' – 'How do we come to have such rich and specific knowledge, or such intricate systems of belief and understanding, while the evidence available to us is so meagre?'" (Cook, 1988, p.57). Chomsky's answer to 'Plato's problem' is that humanity has the innate ability to learn language instinctively. This concept provided answers as to children can learn the language even if they are exposed to only a limited input by the environment (Cook, 1988). At first, the interest of UG was only for first language acquisition as Chomsky tried to answer 'Plato's problem'; however, in the 1980s, when the interest in UG was extended towards SLA, the application of UG in SLA became a controversial issue among researchers (Eubank, 1991).

As time flies and technologies have been dramatically developed, various innovation methods have challenged this question. For example, enhancement of PC can process a man-machine interaction as virtually simultaneous exchanges and such quick response of PC relating system can save a short time human response relating innate human mechanism considered in cognitive psychology. For language acquisition, psycholinguistics are blessed and researchers have studied language processing how human response to language inputs particularly when the inputs are not natural in terms of daily language use, with a software (e.g. Linger (Rodhe, 2001)) that can record the timing when people read a word in a sentence.
For instance, Hofmeister and Sag (2010) examines the island structure and cognitive process and suggested that the sentence structure with processing difficulty increases unacceptability of given phrases. In other words, people need significantly different time to understand to complex language structures compared with the language structures that are common in their language uses.

As another viewpoint, biology has been a central focus of language acquisition in order to understand nature of language since 1950's (which leads to a conceptualization of UG and its relating concepts, such as generative syntax), and advancement of biology has stimulated the approach of language as a human innate system, such as minimalist program (Chomsky, 2007). Furthermore, a growing enhancement in biotechnology, such as genetics and neurobiology, opens a new endeavor to approach this fundamental question on the relationship between human and language (Benítez-Burraco & Boeckx, 2014). Such biolinguistic approaches are applied as a tool to explain the difference between child and adult language acquisition (e.g., Craina, Koringb, & Thorntona, 2016) today and it seems language as a part of human instinct, namely UG, is worthwhile to deepen the complex system of language and its acquisition.

At the same time, latest studies on UG are on the stage of investigation in the first (or child) language acquisition

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and SL/FA research studies seem to be pending before more the decisive conclusion is given. However, SL/FA practices are also awaiting better, or even possible innovation within the growing attention of English as an international communication language, so this paper discusses UG perspectives on SLA and how these perspectives affect a role of instruction in SLA. Firstly the rationality of UG in language learning is discussed, then the issue of UG accessibility hypothesis is analyzed, and finally, the UG perspectives for a role of instruction is discussed based on the status of UG that is going to be determined in the two sections preceding it.

UG EXISTENCE

The first question regarding UG hypothesis is whether UG exists or not, and as an answer, UG can be regarded as an existing function in human's innate systems. Several pieces of evidence presented by researchers indicate UG's existence. Bickerton (1984) mentioned that a unique neurobiological system controls human language is the most probable answer for the question why language universal exists, and there are several pieces of evidence which show it is likely that a human has biological language learning systems. He calls this system as bioprogram hypothesis. The first evidence that supports his bioprogram hypothesis is Creoles. Creoles are created from immigrant languages. Analysing these new languages, Creoles have close grammatical structures. He argues that it cannot be explained by traditional frameworks but can be explained by bioprogram hypothesis. This means, as he said, that bioprogram makes it possible that children analyze grammar and they can choose an appropriate set of rules with limited available input.

Another evidence was the process of first language acquisition by Bickerton (1984). As mentioned previously, it is the question as to why children can acquire language very quickly even if they only came into contact with a limited input. Bickerton explained it is because of the existence of bioprogram. Like Bickerton, Cook (1988) explained the fact that children are able to learn a language despite the complexity of it. Therefore, if children do not have enough data to create language knowledge from the surrounding environment, they must have sources within their mind. Other UG proponents support this fact as a proof of UG existence.

The arguments shown above are a pioneering stage of UG study which widely recognized, refereed standardly as an orthodox understanding of UG to a wide range of SLA specialists. Until that time, there have been thousands of studies and the debate by pros and cons are still in a hot stage: some completely deny the system of UG and recognizes language variety as a combination of other previously known human systems (e.g., Evans and Levinson, 2009), or even language acquisition is not an instinctive ability (Evans, 2014). In detail, Dąbrowska (2015) summarised the arguments surrounding UG as follows:

> (1) Language Universals: (All) human languages share certain properties.
> (2) Convergence: Children are exposed to different input yet converge on the same grammar.
> (3) Poverty of the Stimulus: Children acquire knowledge for which there is no evidence in the input.
> (4) No Negative Evidence: Children know which structures are ungrammatical and do not acquire overgeneral grammars in spite of the fact that they are not exposed to negative evidence.
> (5) Species Specificity: We are the only species that has language.
> (6) Ease and Speed of Child Language Acquisition: Children learn language quickly and effortlessly, on minimal exposure.
> (7) Uniformity: All children acquiring language go through the same stages in the same order.
> (8) Maturational Effects: Language acquisition is very sensitive to maturational factors and relatively insensitive to environmental factors.
> (9) Dissociations between Language and Cognition: Some clinical populations have (relatively) normal language and impaired cognition; some have impaired cognition and (relatively) normal language.
> (10) Neurological Separation: Different brain circuits are responsible for representing/processing linguistic and non-linguistic information.
> (pp. 2-3)

The position of doubt in UG is called The Language Myth (TLM) and this trend seems to be one of the major stands on the relationship between human and language. For example, Evans and Levinson (2009) reasons language diversity occurs because of cultural-historical events and entailed cognitive processes by human – UG is no longer a superior explanation for human language acquisition. Or even more moderate, UG would exist, but the effect of such language acquisition system is quite limited that is within the error compared with other language learning mechanisms (Dąbrowska, 2015).

On the other hand, others develop the theory of SL/FA learning under the premise of UG existence as a basic part of the human ability. For instance, Goldberg (2016) argues that the popular idea of TLM has not been given a sufficient evidence that persuade as a counterargument against the long history of UG by mentioning research studies dated from an early stage from present (Goldberg mentions: Ambridge et al. 2014, Christiansen & Chater

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2008, Elman et al. 1996, Evans & Levinson 2009, Everett 2012, Goldberg 2013, 2016, Hurford 2012, Newmeyer 2016, Sampson 2005, Tomasello 1995). There are many firm studies to indicate the existence of UG and TLM oversimplify the facts reported in this regard.

From the discussions presented above, even though there is some doubt, it is still a reasonable possibility that UG exists innately in the human system (even though Bickerton used a term different to UG, the concept can be regarded as UG)- at least UG or another instinctive language acquisition system is not a stage of total denial which can be totally through away and forgotten – so the following argument is going to be discussed as the premise of UG existence in the human mind.

UG ACCESSIBILITY HYPOTHESIS

After UG existence is reasoned, the next question is the relation between adult learners and UG, since UG was proven to exist in children's first language acquisition in the previous section. Among the hypotheses, one of the possible answers is the adult L2 learner can access UG partially and they are also affected by language transfer in a certain level – partial access and partial transfer.

In terms of the issue of L2 UG access, White (2000) introduced the UG accessibility hypothesis with five possible cases. The first case is full transfer/partial (or no) access. This means adult L2 learners cannot access UG directly, and their major source of language acquisition is L1 grammar. The second case is no transfer/full access. In this situation, L2 learners can learn a language in the same way as a child how children acquire their first language. The third is full transfer/full access. Similar to the first case, L2 learners acquire a language by L1 grammar basis, but they also have fully UG access just like in the second case. The fourth case is partial transfer/full access. In this situation, L2 learners can use L1 grammar and UG at the same time, and the final state of the acquisition is complete L2 grammar. The final possible situation is partial transfer/partial access. This means L2 learners can access UG partially and they are also influenced by the L1 grammar. This position supports that L2 learners cannot acquire complete L2 grammar. In the following section, the five cases will be analyzed to determine which one most supports L2 learners' UG accessibility.

Regarding UG accessibility, some researchers argue that adult L2 learner cannot access UG at all. For example, Bley-Vroman (1989) argued that L2 learner can fail to acquire a language even after a long period of study; therefore, they must not be able to access UG at all. In addition, Felix (1991) mentioned studies (he introduces Clahsen, 1988; Felix, 1985; Zobl, 1986) show second language learners' acquisition behaviors are different from first language acquisition. For example, Clahsen and Muysken (1986) shows adult L2 learners have difficulty to grasp the SOV word order in German while first language learners can grasp this rule effortlessly. However, there are also several pieces of evidence that indicate there were UG accesses by L2 learners. Felix (1991) mentions that numerous studies (he picks up Felix, 1988; Flynn, 1988; Haegemen, 1988; White, 1985, 1988) show that L2 adult learners demonstrate the possession of abstract grammatical properties that is not taught or is not similar to the first language. This indicates L2 learners can access UG at a certain level. From previous discussions, Felix (1991) concludes partial access is the most probable condition in terms of L2 access and it seems to be the most rational alternative compared to the full/no access hypothesis.

In terms of language transfer, Odlin (1989) defined language transfer as "the influence resulting from similarities and differences between the target language and any other language that have been previously (and perhaps imperfectly) acquired" (p. 27). According to Odlin (1989), there are two types of transfers: negative transfer and positive transfer. Negative transfer is interference by native language. Schachter (1974) shows, on the one hand, Chinese and Japanese students tend not to use relative clauses because their native languages do not have a syntactic system of relative clauses. In addition, Japanese students use too many simple sentences to avoid using relative clauses. These are examples of negative transfer. On the other hand, positive transfer comes from similarities of native and target language and it makes learners' language acquisition effective and easy. For example, similar vocabulary, similar vowel and consonant sounds, or similar syntactic structures between languages can lead to a positive transfer.

In addition, other than structural factors, non-structural factors also affect language transfer. For example, a learner's personality affects language transfer. Odlin (1989) mentioned anxiety and empathy affect transfer because these reflect on the attitude for a language such as the reluctance of using the unfamiliar structure as Japanese students do not use a relative clause in sentences. Taylor (1975) pointed to another factor – learner's proficiency. He mentioned advanced learners rely on language transfer much less than non-advanced learner because they have knowledge of the target language and ability to construct analogies. This indicates the ratio of language transfer is not static, but changeable based on structural/ nonstructural factors. As a result, it is partial transfer in L2 learning. From this discussion, it is possible that adult L2 learners can access UG partially and they are partially influenced

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by language transfer.

Similar experiments have been tested. For example, Kong (2005) investigates L2 English speakers who are L1 Chinese speaker by measuring how they accept English null subjects. The conclusion is not to support full access position and old L2 learners do not reset but adjust their pre-acquired parameters which help to understand the structure only in the target language. Partial access/partial transfer seems a priority position. However, the conclusive result has not been gained. Farahani, Mehrded, and Ahghar (2014) discussed UG accessibility in adult SLA learners and suggested that all of no/partial/full UG access position faced confrontation for their arguments. Therefore, since they are some evidence which shows access could not be null nor full, still partial access can be a reasonable prediction that can be applied to SLA activities as a useful framework.

UG PERSPECTIVES AND ROLE OF INSTRUCTION IN SLA

Basically, the instruction is regarded as having a weak effect in language acquisition by UG perspectives (Cook, 1988). However, UG perspectives can be applied for effective instruction of SLA. Schachter (1984) discusses the importance of input in language learning and he also mentioned input provides partial views of UG properties. In addition, appropriate place of communicative input stimulates language acquisition. To adopt his viewpoint, it is predicted that instruction can make learners notice UG properties and it stimulates language acquisition as instruction can be regarded as a certain type of input and it provides rules which correspond with the rule on UG. Moreover, Kirkwold (2005) suggested in regards to this "frequency factor", teachers need to familiar with what the rules are taught implicitly or explicitly.

From another point of view, it was also indicated that educators can improve learners L2 proficiency only through the limitation of instruction. As shown by previous studies, UG makes it possible to learn a language with only limited input because a human has the innate set of rules on languages. Under an instructive environment, the method instruction only provided a limited time that an educator can a teach language to learners, and it is impossible to discern completely possible grammatical structures in this time. However, UG access stimulates learners' language acquisition even if they only receive a limited amount of information from the educator. In other words, educators can be sure that they can improve learner's proficiency even when they interact with the learners for a short period of time.

Since L2 learners can access UG partially and they are influenced by transfer, they may not improve their language proficiency with the same accuracy as children, but UG ensures L2 learners can achieve a certain level of proficiency based on their condition. In this sense, if instructors can provide accurate information instead of language input randomly provided by inaccurate sources, learners might not spend needless time on rejecting unnecessary rules, and accurate input directly can set some rules that are a component of possible grammatical structures.

In addition, previous studies indicated that UG gives limitation on possible infinite structures by the L2 learner. Combination of rules makes it possible to create an infinite set of sentences of people. However, because of UG restriction, it puts a limit on people's creation and it makes it possible for educators to guess learners' errors. Under that condition, instructors can teach for and make an effort to correct the limited possibility of errors and it can make learners reject inappropriate rules one by one. Because of language transfer, some errors cannot be rejected easily. However, it is possible for learners to decrease their errors to a minimal level as their possible creations of errors are also restricted by UG influence.

If L2 learner cannot access UG at all, the method instruction may not be able to work because this indicates learners can create only the limited sentences that they have learned – this means they cannot adopt many situations in terms of language use or teaching new rules makes learners create much more numerous amount of incorrect structures based on the combination of rules if it is not restricted by UG. On the other hand, the instruction can be regarded as essential stages in SLA because of UG. Since not only can instruction be positive evidence as an input, but also L2 learners are also influenced by the language transfer. If learners do not receive instruction, it needs much time to choose, adapt, and reject the rules by input from their surroundings. Instruction makes language acquisition more efficient and accurate.

CONCLUSION

In conclusion, this paper discussed the UG perspectives and the role of instruction in SLA. UG is a set of innate language rules in the brain and the pieces of evidence – the case study of Creole and child first language acquisition – are an indicator that shows the existence of UG. Moreover, whether an L2 learner can access UG is controversial, UG would be still a useful understanding of language acquisition and an improvement of language learning. At the same time, some researchers deny it because L2 language acquisition behavior is different from L1 of it.

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However, other evidence indicates that it is likely that the L2 learner can access UG partially. Language transfer also needs to be considered and it is possible that language transfer has arisen based on structural/non-structural factors. Therefore, L2 learners may be affected by partial language transfer. From these discussions, the most rational option is to adopt partial access/partial transfer of UG accessibility hypothesis.

Generally, UG perspectives regard the method of instruction as inadequate, capable of limited influence only. However, the instruction can be regarded as essential. One thing is that input is important in UG perspectives and the learners acquire language through the process of judging and adapting or rejecting certain rules with UG access. Instruction is regarded as input that corresponds with the rule in UG and it might make learning faster and more accurate.

Moreover, UG restricts the infinite possibility of sentence creations by learners. This means interpreting that instructors can guess the types of errors that learners create because of UG restriction and instruction decrease the number of errors because the number of errors is limited by UG, even if it takes time since language transfer is not ignorable factors. Therefore, the method of instruction can still be effective to improve learners' language proficiency.

This paper intends to discuss on the broad perspective on UG in SLA and this position also owes limitations that there is much room in discussing some details or exceptions entailed in language acquisition and further studies, including experimental study or case studies, are recommended, by incorporating the latest findings including first language acquisition studies.

From the above discussions, UG is an area under research that could increase the effectiveness of language learning, and it can also provide people with the same ability to learn a language to a certain level of high proficiency despite the fact that second language acquisition is a challenging task.

Biodata

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TEACHERS' AND PRACTITIONERS' ASSESSMENT ON THE LEARNING SET OF CHARACTER-CONTAINING STORYTELLING MODEL USING STIMULUS RESPONSE-BASED COOPERATIVE METHOD

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ABSTRACT
The objective of research was to find out the teachers and practitioners' assessment on learning implementation plan (RPP) of Character-Containing Storytelling Learning Model using Stimulus-Response Cooperative Method developed by author. This research is a part of dissertation entitled "The development of Character-Containing Storytelling Learning Prototype Model in Junior High School using Stimulus-Response-Based Cooperative Method". After preliminary study was conducted to find out the map of teachers' and students' needs in storytelling learning, the learning set to be used (RPP) was tested theoretically and empirically by teachers and teachers and practitioners of Indonesian language and letters learning practitioners conducted through theoretically construct and validated by teachers and practitioners in the form of Focus Group Discussion (FGD). Techniques of collecting data used were interview and FGD. The data collected was analyzed descriptively qualitatively and argumentatively. From the data of teacher's and practitioner's assessment, it could be concluded that RPP score had belonged to a very good category, as all scores have been more than 80. The mean score of RPP was 86.47. The conclusion was that RPP had been feasible and adequate to be used in storytelling learning with Stimulus Response-Based Cooperative Method.
Keywords: Learning model, storytelling, character, cooperative, stimulus-response.

INTRODUCTION

The change of curriculum from KTSP (Education Unit Level Curriculum) into the 2013 curriculum will affect the learning process. The learning activity formerly applies EEK (exploration, elaboration, and confirmation) changes into 5 M (observing, questioning, collecting information, associating, and communicating). Similarly, the assessment used was the authentic one. The assessment of 2013 curriculum included those of attitude (affective), knowledge (cognitive), and skill (psychomotor). Affective assessment is the activity conducted by educators to obtain descriptive information about the students' behavior. Meanwhile, the cognitive assessment is the activity conducted by educators to measure the students' cognitive mastery and psychomotor assessment is the activity conducted by educators to measure the students' ability of applying knowledge in doing certain assignment (Education and Culture Minister's Regulation Number 23 of 2016 about Standard Education Assessment).

The 2013 curriculum is a text-based curriculum. The revision on 2013 curriculum in 2026 results in significant change in Indonesian language subject, particularly in its material. In the 7th grade of SMP/MTs there are eight types of text: (1) description, (2) narration (fantasy story), (3) procedure, (4) observation, (5) folk poetry, (6) folklore, (7) letter, and (8) literacy.

Several Junior High Schools (SMP) of Surakarta have implemented the 2013 curriculum. Considering the revision on the 2013 curriculum, fantasy story belongs to one form of narration text in Indonesian language text in the 7th grade. Narration is a fiction containing event development. A series of events in the story is called plot. A series of event in the story is operated in causal law. The story develops from introduction stage (what, who, and where the event occurs), conflict occurrence, and settlement. Narration has theme/basic idea becoming the center of story development. Theme can be formulated from a series of events in the story plot. Mandates is a story's element becoming the author's message through its story. Mandate is related to life values that can be inferred from the story content (Harsiati et al., 2016: 50).

Fantasy story is a fiction story with fantasy genre (imaginative world created by the author). In fantasy story, something impossible can be made possible (ordinary). Character and setting created by the author do not

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exist in real world or modified real world. The themes of fantasy are magic, supernatural, or futuristic (Harsiati et al., 2016: 50).

In Basic Competency KI 3 it has been mentioned that 3.3 Students can identify the elements of narration text (fantasy story) read and heard and 3.4 Students can study the structure and language of narration text (fantasy story) read and heard. Meanwhile in Basic Competency KI 4, it is mentioned that 4.3 Students can retell about the content of narration text (fantasy story) heard and read, and 4.4 The Students presents creative idea in the form of fantasy story orally and in written form by considering language structure and use.

Thus, the students, in addition to be required to identify the elements of narration text (fantasy story) read and heard and to study the structure and language of narration text (fantasy story) read and heard, the students can also be required to retell the content of narration text (fantasy story heard and read and to present creative idea in the form of fantasy story in either spoken or written manner by considering language structure and use.

Regarding this, the objective of research is to find out "Teacher and practitioner's assessment on the Character-Containing Storytelling Learning Set Model Using Stimulus Response-Based Cooperative Method developed by the author.

Storytelling Learning at School

So far, storytelling or speaking learning among the students is not as expected generally. Some phenomena can be seen, for example: the students find difficulty in expressing their idea, thinking, and wish to their teachers and friends. In addition, the students speak hesitantly, choose words difficultly, and speak unquietly (Muammar, 2008: 118).

It is in line with Chaniago (2011:121) stating that the students often find difficulty in speaking before the public. Words and sentences are suddenly lost and disconnected. The heart beats fast. And they are speechless.

Such the condition is consistent with the result of preliminary survey on storytelling learning implemented in Junior High Schools of Surakarta. From the result of survey, it can be concluded that teacher finds difficulty in motivating the students to tell story bravely before the class. So far, the students often decline to tell story before the class. When they are told to retell story they usually do so shyly, nervously, not chronologically, and often forget what they want to tell.

The data found by Nugraheni (2009: 297) concerning storytelling skill learning in the 7th-H graders of Junior High Schools proves the preliminary survey. Considering the interview with the students conducted by Nugraheni (2009: 299), it can be found some factors making the students speaking less bravely before the class. They are: (1) students not accustomed to perform before the class, (2) students' shy feeling to teachers and other students, (3) students' less confidence, (4) students' unsmooth speaking, (5) students' feeling of running out of speaking material, (6) students' fear of being laughed at, (7) students' nervous and tense feeling, and (8) student's feeling of having no speaking talent.

Regarding this problem, Hidayat (2006: 3) suggests that the students' low speaking skill is inseparable from the language learning in the classroom. In the class, teacher teaching writing and reading more than speaking and listening. Indonesian language is taught particularly for reading and writing, while other language skills (listening and speaking) are slightly neglected (in Muammar 2008:318).

Relevant to the statement above, Muammar (2008:319) states that Indonesian language teacher tends to use conventional approach so that speaking skill learning activity runs monotonously and boringly. The students are not invited to learn language, but tend to be invited to learning language theories. Recalling the mastery of spoken language is more functional in daily life, speaking ability should get adequate attention in language learning and language ability test.

The monotonous and less innovative learning condition should be solved. Teachers should find an appropriate strategy to convey learning in more attractive and meaningful way. Therefore, in storytelling learning *a Character-Containing Storytelling Model Using Stimulus Response-Based Cooperative Method* will be developed.

Character-Containing Storytelling Model Using Stimulus Response-Based Cooperative Method

A successful learning is inseparable from the way of developing effective learning models in the learning process. This learning model development aimed to create learning condition making the students to learn actively and joyfully thereby improving their learning process and outcome (Aunurrahman, 2012:140).

Arends (in Suprijono, 2011: 48) states that learning model refers to the approach to be used, learning objective, procedure of learning activity, learning environment and class management. The learning model is a conceptual framework depicting a systematic procedure in organizing learning experience to achieve learning objective.

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In storytelling learning, cooperative learning is selected. In this learning, the students work in small group helping each other, discussing and arguing with each other in learning the lesson material (Slavin 2005: 4).

Cooperative learning can be used to improve the students' achievement, developing inter-group relation, acceptance to classmates with poor academic performance, and self-esteem (Slavin 2005: 10). In similar vein, Trianto (2011:18) states that cooperative learning is an effective teaching strategy in improving the students' achievement and socialization, and contributes as well to their improved attitude and perception on the importance of learning and working together. By telling story along with friends in one group, the students' motivation and self-confidence thereby improving their storytelling skill.

Tahir (2010: 47-59) found the effectiveness of cooperative class. He compares the effectiveness of cooperative class with that of traditional class. Experimental study was conducted to compare and to see the learning outcome of students' taught with cooperative learning and those with traditional method in Pakistan class. The result of his research showed that academic achievement of experiment group is better than that of control group. In addition, experimental group showed the superiority in self-esteem, motivation and social level.

Cooperative learning in literary studies was also conducted by Nystrand (1995:14). He explained the use of small groups to think and to respond to the letters. The result of research showed that cooperative learning in small group is more effective than competitive and individualistic learning. The use of small group helps the student think and reason about the letters presented.

Inuwa, U., Abdullah, Z. & Hassan, H. (2017) in their study on accounting achievement in the secondary school students in Gombe state, Niger, proved that in post-trial stage, the achievement of students exposed to cooperative learning was better than that of those exposed to conventional learning. Therefore, he recommended the government to encourage the curriculum planner and secondary school teachers to adopt cooperative learning in the class.

In implementing storytelling learning, the students will be grouped in pairs. In practice, the students will read entire text on fantasy story shared. Then, they practice to tell the story without text. When a student tells a story, the others will listen to while noting the strength and weaknesses of storyteller (the students make assessment based on indicator of storytelling specified by teachers). It is done in turn. This method is called a stimulus response-based cooperative script learning method.

Suprijono (2011: 126) explains that Cooperative Script learning method is the one in which students learn to summarize the parts of material learnt in pair and in turn. This procedure of learning is as follows. (1) Teacher groups the students in pairs. (2) Teacher distributes discourse or material to be read and summarized by every student. (3) Teacher and students determine who the first one serving as speaker and listener. (4) The speaker reads the summary as completely as possible, by including main idea into his/her summary, while the listener listens to, corrects, or shows the less complete main idea, helps remember or memorize the main ideas by connecting it to previous material or to other materials. (5) Role exchange, the one formerly serving as the speaker now becomes the listener; and vice versa. (6) Teacher and students draw a conclusion together. (7) Closing.

Stimulus-response theory is the one attempting to create the relationship between stimulus and response as much as possible. The learning with stimulus-response strategy is an effective to apply to speaking skill. It is confirmed by Iskandarwassid and Sunendar (2008: 240) stating that speaking learning strategy refers to stimulus-response principle. This type is closely related to the behavior of students consciously responding appropriately to the stimulation in learning situation.

This research will be associated with character education because storytelling learning is considered as one effective way of educating the students' character. Human beings with good character are very desirable in dealing with the globalization. To create human beings with good character, character education is required.

Character education is the one creating and individual's personality through character education, the result of which can be seen in an individual's real action, good behavior, honesty, responsibility, respect to others' right, hard work, and etc (Lickona 1991 in Megawangi 2007: 83).

Definition of Learning Implementation Plan (RPP)

In Education and Culture Minister's Regulation Number 22 of 2016 about Standard Process of Primary and Secondary Education, it is mentioned that Learning Implementation Planning (RPP) is the plan of face-to-face learning activity for one or more meeting. RPP is developed from syllabus for directing the learning activity of students in the attempt of achieving Basic Competency. RPP developed in detail refers to syllabus, textbook, and guidelines.

Each teacher in education unit obligatorily organizes RPP completely and systematically as the beginning step of learning process. It is intended to make the learning running interactively, inspiringly, joyfully, challengingly, and efficiently in the attempt of developing high-order thinking skill. RPP is organized based on a series of Basic Competency in one or more meeting. This RPP organization is conducted in the beginning of each semester or school year, but it should be reformed before the learning is conducted.

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The development of RPP can be conducted individually or in group through Subject Teacher Discussion (MGMP) in school/madrasah (Islamic school). It should be coordinated, facilitated, and supervised by headmaster/madrasah or senior teacher assigned by headmaster/madrasah. The development of RPP conducted by teacher in group through interschool or inter-area MGMP is coordinated and supervised by supervisor or local Education Service or Religion Ministry Office.

This article will present the Teacher's Assessment on Learning Implementation Plan (RPP) for the Storytelling Model with Stimulus Response-Based Cooperative Method developed by the author.

Method

This study was a research and development (R&D) in the form of operational research (Gall, Gall, and Borg 2003:123-124). The procedure of Borg and Gall's research and development is developed by Sukmadinata and colleagues consisting of three stages: 1) Preliminary Study, 2) Model Development, and 3) Model Test (Sukmadinata, 2012: 184).

This research is a part of three-stage research and development. For that reason, this research will focus only on development stage aiming to produce prototype of storytelling learning model. This prototype involves design: syllabus, RPP, learning strategy, learning material, and assessment. Among those six designs, the author only focuses on one design, RPP.

Having conducted preliminary study to find out the map of teacher and student's need in story telling learning, the learning set to be used, Learning Implementation Plan (RPP), was tested theoretically and empirically by Indonesian language and letters learning teachers and practitioners conducted through theoretical construct and validation by teachers and practitioners in Focus Group and Discussion (FGD). This article focused on teachers and practitioners' assessment on Learning Implementation Plan (RPP). Techniques of collecting data used were interview and FGD. The data collected was analyzed descriptively collectively and argumentatively.

RESULT AND DISCUSSION

Here is the teachers and practitioners' assessment on Learning Implementation Plan (RPP) component of Character-Containing Storytelling Model Using Stimulus Response-Based Cooperative Method developed by author. The assessment of learning set is conducted to get approval from teachers and practitioners before the learning set is tried out.

NO	COMPONENT OF LEARNING PLAN	SCORE/VALUE
A	**Learning objective formulation**	
1	Formulation Clarity	80
2	Completeness of formulation coverage	80
3	Compatibility to Basic Competency	87.5
B	**Teaching Material Selection and Organization**	
1	Compatibility to learning objective	95
2	Compatibility to students' characteristics	82,5
3	Material chronology and systematization	85
4	Compatibility to time allocation	80
C	**Learning source/learning media selection**	
1	Compatibility of learning source/learning media to learning objective	95
2	Compatibility of learning source/learning material	92.5
3	Compatibility of learning source/learning media to the students' characteristics.	87.5
D	**Learning Scenario/activity**	
1	Compatibility of learning strategy and method to learning objective	87.5
2	Compatibility of learning strategy and method to learning material	90
3	Compatibility of learning strategy and method to students' characteristics	87.5
4	The completeness of steps in every learning stage and the appropriateness of time allocation	82.5

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E.	**Learning Outcome Research**	
1	Compatibility of assessment technique to objective	87.5
2	Clarity of assessment procedure	82.5
3	Instrument completeness	87.5
	The mean score of RPP	86,47

From the data of teachers and practitioners' assessment above, it can be concluded that RPP score has belonged to very good category, as all scores have been above 80. The mean score of RPP is 86.47. Nevertheless, some recommendations for improvement are given by practitioners and teachers to RPP with *Character-Containing Storytelling Model Using Stimulus Response-Based Cooperative Method* developed by author.

Components of learning objective formulation, formulation clarity, and formulation coverage completeness obtain score of 80, while compatibility to basic competency obtains higher score of 87.5.

Here is the teachers' comment on RPP organized by the author. SHR said that the RPP of "fantasy story" learning implemented so far has been consistent with the 2013 curriculum's demand. He/she recommended the formulation and completeness of formulation coverage to be clarified in learning objective formulation. SNA said that indicator of studying linguistic elements should also be added.

Regarding teaching material selection and organization, it can be concluded that the highest score is found in compatibility to learning objective (95), compatibility to students' characteristics (82.5), material chronology and systematic (85), and compatibility of material to time allocation (80).

According to some teachers, the material existing in RPP appendix has been consistent with learning objective, compatible to students' characteristics, chronological and systematic, and appropriate to time allocation. The material enclosed has been selected thereby fulfilling the criteria as a good material. According to some teachers, children prefer fantasy story relevant to the present time or packaged modernly, for example, comic. Therefore, teacher should select the story material creatively. Meanwhile for the material of fantasy story, a not-too-long fantasy story material should be selected, so that students can practice it more effectively. In addition, the story material selected should contain moral education value. Thus, the students can imitate good dispositions indirectly from the characters.

A practitioner, ES, said that the selection of story material deriving from internet should be done selectively and thoroughly. In addition to its story substance, the story selection also considers the use of good Indonesian language as this story material is used to learn Indonesian language subject and to learn the use of good Indonesian language norm all at once.

Regarding the selection of learning source/learning media, his scoring is 95 for the compatibility of learning source/learning media to learning objective, 92.5 for the compatibility of learning source/learning media to learning material, and 87.5 for the compatibility of learning source/learning to students' characteristics.

Just like material, teachers and practitioners' assessment on learning source has been very good. Learning source/learning media has been appropriate to learning objective, learning material and students' characteristics.

Regarding the learning source, some teachers state that they have had a book of folklore collections. Some teachers have had fantasy story collection originating from archipelago folklore.

Meanwhile, the story source can be obtained from textbook, story collection book, internet, library, and VCD. Sometimes children are also asked by teachers to bring their own story. Teachers recommend the teachers to collect fantasy story from some learning source. Thus, teachers have varying and non-monotonous collection of fantasy story.

It is relevant to information from some teachers shown as follows. Some teachers (SKN, FR, NP, DIR), "fantasy story" learning implemented so far has used video and text media to generate students' imagination power for storytelling, because fantasy story aims to develop students' imagination in storytelling.

DIR said that "fantasy story" learning implemented so far makes the students enthusiastic as the material is very attractive. In order to be more attractive, he/she usually uses video/movie media in 10-minute duration (so that they listen it joyfully). In addition, teachers also use story books.

Teachers' assessment and practitioners related to learning scenario/activity can be seen as follow. The compatibility of learning strategy and method to the learning objective is 87.5, to learning material 90, and to students' characteristics 87.5, and the completeness of steps in learning stage and time allocation appropriateness is 82.5.

Learning Implementation Plan (RPP) in the main activity of learning is organized with *Character-Containing Storytelling Model Using Stimulus Response-Based Cooperative Method (Cooperative Script)*. In this activity, in the first meeting, the students have worked in group to discuss the definition of fantasy story, the examples of fantasy story, and to identify the text structure of fantasy story, and to study its language element. In the second and third meetings, the students are given material of good storytelling technique and the teachers deliver indicators of storytelling assessment; thereafter the students are given opportunity of storytelling practice.

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Teachers explain the procedure of storytelling learning with cooperative script method based on stimulus-response. (a) Students sit down in pairs, with the partner specified by teacher. (b) Students receive fantasy story text from teacher (the partner gets the same story). Other partner perhaps receives the same or different text from other partner. (c) The students read and understand the text read. (d) Students in pair discuss the text read. (e) The students in pair determine the structure of fantasy story text. (f) The students write summary of fantasy story text read. (g) The students organize the frame of story to facilitate storytelling. (h) Students practice storytelling individually (i) the students practice storytelling by means of being listened to by their pair. (j) The student pairs tell the story in turn. (k) If A tells story, B listens to it while noting anything needing correction (improvement). Similarly, they exchange role (stimulus-response). (l) Indicators used to give input to partner include story mastery, smoothness, spelling, intonation, expression, and story structure. The input to students is read after the partner has told the story completely. Help can be given to make their partner tell the story smoothly. (m) Teachers give the students the opportunity of retelling the fantasy story text they have read (previously, teachers demonstrate storytelling model in pair) before the class.

Teachers and practitioners' comment on this model is that they agree with this model. FR said that *Cooperative Script* learning based on stimulus-response has been good if applied in fantasy story learning. The students in pair can help each other. However, it is noteworthy that the students' understanding level is different so that a format or design that can be used as storytelling guideline is required. In addition, the students can combine their perception through such the format.

In line with the statement, according to NP, the application of *Cooperative Script* based stimulus-response had been fairly good when applied in fantasy story. However, attention should be paid when equating perception between one student and his/her partner. When their perception is not the same, the student who tell the story and then given stimulus-response by his/her friend will continue the story confusingly. However, when their perception has been the same, the students' storytelling activity will run as expected. SKN said that learning model existing in RPP had been good and consistent with the development level of 7th graders.

Meanwhile, according to DA, learning model with *Cooperative Script* based on stimulus-response is understood by student because the students practice in pair directly. As practice, they assess and comment on their partner's appearance. It is conducted of course with teachers' guide.

The application of stimulus response-based *cooperative script* learning model containing in RPP had been good and appropriate, according to DIR. What should be considered is that the students should find out the good storytelling technique and indicator used to assess the students' storytelling ability.

A literary learning practitioner, SYT, said that the application of cooperative script has been fairly good and students' different perception should be considered. The concept material of fantasy story should be elaborated. The presented material is adequate.

Teachers' and practitioners' assessment can be concluded as follows: the compatibility of assessment technique to learning objective is 87.5, the clarity of assessment procedure is 82.5, and the completeness of instrument is 87.5. The assessment involves cognitive, affective, and psychomotor assessment.

Particularly for the assessment of performance or psychomotor, a practitioner, SYT, explained as follows: the assessment of fantasy storytelling practice will end up in storytelling ability later with the character-containing fantasy story material. This character can be obtained from the message of story. Teachers should explore indicator by adjusting Basic Competency and the students' characteristics.

Input from a practitioner (RS) related to the indicator of storytelling assessment should be evaluated. The four indicators of assessment in practicing retelling the fantasy story are: (a) bravery; (b) language use including diction, words, and intonation; (c) storytelling appearance/attitude; and (d) material mastery.

Regarding the assessment, teachers recommend as follows.
(a) The instruction should use understandable word/sentence to students thereby not resulting in multi-interpretation (NP and FR). (b) Diction is expected to be adjusted with the 7th graders' competency (SKN).

Considering teachers' and practitioners' assessment on Learning Implementation Plan (RPP), *Character-Containing Storytelling Model Using Stimulus Response-Based (Cooperative Script) Cooperative Method* developed by the author, it can be said that this RPP has been very good and feasible to be used in storytelling learning. It can be seen from the mean score of all RPP components, 86.47.

Teachers said that the material contained in RPP appendix has been consistent with learning objective, corresponding to the students' characteristics, chronological and systematic, and appropriate to time allocation. The material chosen has been selected so that it has meet the criteria as a good material. To stimulate the students in order to be interested in storytelling, teachers usually use attractive media. One of them is audio visual (video) media of fantasy story in 10-minute duration, so that children listen to it joyfully. Before the video is shown in the class, teacher should have watched it and selected it to find out whether or not the video is feasible to watch by the students. It is relevant to Barclay, Campbell and Weeks (2007) states that an interactive learning media consistent with the learning should meet the aspects of material, presentation, language and readability, and illustration.

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Learning model with stimulus response-based Cooperative Script, according to teachers, is understandable to the students as the students can practice directly in pair. As a practice, they can assess each other and comment on their partners' appearance. The effectiveness of Cooperative Script model in learning has been studied by Oktaviyana (2015) in her research entitled *The Cooperative Script Type of Cooperative Model Application with pictorial media to improve Speaking Skill in the 4th graders of SDN Tanuharjo in the school year of 2014/2015.* The result of research shows that the Cooperative Script Type of Cooperative Model Application with pictorial media can improve speaking skill of the 4th graders of Elementary School.

The assessment conducted by teacher in story telling learning is the sustainable process. It is in line with Brown (2004) stating that assessment is the sustainable process conducted by teachers unconsciously in assessing the students' demonstration. Teachers usually give assessment when the students respond to question the teachers hive, comment on or present the material orally. So, in language assessment, any activities of students showing off their ability of responding to teachers should be categorized as assessment. Regarding this, cognitive, affective, and psychomotor assessments in storytelling learning in the 2013 curriculum are very relevant.

CONCLUSION

From teachers' and practitioners' assessment on Learning Implementation Plan (RPP) of *Character-Containing Storytelling Model Using Stimulus Response-Based (Cooperative Script) Cooperative Method* developed by the author, it can be said that this RPP has been very good and feasible to use in storytelling learning. It can be seen from the mean score of all RPP components, 86.47.

For the model developed to be implemented effectively, the development of good learning set should be organized maturely. Therefore, recommendation and input from practitioners and teachers to RPP should be considered and noted for the improvement of RPP.

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THE DEVELOPMENT OF THE CONCEPTUAL LEARNING DESIGN MODEL BASED ON GENERIC SKILLS

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ABSTRACT
This study as part of larger study aimed to specify a product development model of problem-based learning design to improve generic skills of learners. Specifically, this study aimed to identify how to construct the components of the problem-based learning design model to improve generic skills as conceptual models, and how to represent components in the form of problem-based learning design models to improve generic skills as conceptual models.
Keywords: the problem-based learning, design model, Indonesia

INTRODUCTION

The problem being faced in Indonesia is about low educational quality as a quality of human resource printing. In this case, the quality of chemical education resulted in declining the competitiveness in the current era of globalization. The low level of chemical mastery can be seen from the average value of the national chemical examinations from 1999-2000 ranging from 4.4 to 5.0 (Surapranata, 2004). This indicates that the success of an educational curriculum depends on the teacher's performance in developing the learning activities in the classroom. Teachers are most responsible for realizing qualified human resources capable of responding to changes occurred during the development of science and technology. For that, the need for efforts to prepare qualified teachers from an early age started from the lecture (Khambayat & Majumdar, 2010). It means that the realization of qualified teachers can be carried out since the preparation of prospective teachers before deployed to the field. This is in accordance with the opinion of Lawrence-Lightfoot (2008) which states that teacher coaching needs to be carried out since pre-service education. McDermott (1990) argues that the mastery of subject matter knowledge of a prospective teacher is determined by the learning process he experienced. Klausner (1996) provides an example, if a science teacher (including a chemistry teacher) is expected to teach an inquiry-based science then the prospective teacher must have undergone an inquiry-based course, as well as to develop critical thinking skills, be creative, able to solve problems and be able to communicate. Prospective high school teachers need to be equipped with school-oriented lectures. Poedjiadi (2005) suggests that the lecture model for potential chemistry teachers needs to be more focused on student-centered learning reflecting the nature of chemistry, chemistry as a process, chemistry as a product, and chemistry as an attitude.

Chemistry lecture conditions recently for prospective teachers at the Development Institute of Information and Communication Technology still does not reflect the ideal state according to the nature of chemistry as mentioned above. In fact, the Directorate General of Higher Education (Ditjen Dikti) since 2003 has published High Education Long Term Strategies 2003- 2010 or known as HELTS. Most universities including educational institutes of educational lecturer need to be bound in one goal formulated in the vision 2010 of Indonesian Higher Education, which in 2010 has been able to realize high education system with a healthy college so as to contribute to the competitiveness of nations that have quality features, access and justice, and autonomy and decentralization.

The HELTS program, assurance and quality control efforts need to be applied in all universities (including the Development Institute of Information and Communication Technology) that produce prospective teachers. Concrete steps pursued are improvements in lecture activities of prospective teachers. Educational institutes of educational lecturers need to pursue lectures in accordance with field demands. Therefore, it needs to be more serious handling

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in pursuing a model of chemistry lectures for prospective teachers in line with the chemical characteristics and oriented to its tasks in the field later. The success of learners after taking the learning during their college at the undergraduate level, especially in the educational program is not only seen from the achievement of Student Achievement score as a prospective teacher, but also further importantly seen from the ability to carry out the task of learning in the place of duty. This ability is also called teacher competence. A teacher performs his/ her duty will look more professional if it has a minimum skill called a generic skill or called basic skills.

The essential generic skills are owned by every prospective teacher as a stock to run the profession later. This is confirmed by the Key Life Area (KLA) Curriculum Guides (Primary 1 to Secondary 6) in 2017 that generic skills should be developed in all stages of education, in all major subject areas (Curriculum Development Officer, 2017). Learners should be able to transfer them from one context to another, whether in science or not. The transfer of these skills will help learners continue to learn and succeed in personal development and lifelong learning. Key Learning Area (KLA) Curriculum Guides (Primary 1 to Secondary 6) in 2017 emphasizes that there are nine generic skills recommended in learning; collaboration skills, communication skills, creativity, critical thinking skills, information technology skills, counting skills, problem solving skills, personal management skills, and research skills. Of these skills, a priority should be placed on communication skills, creativity and critical thinking skills, and specifically for science education; problem-solving skills.

The author's report (2015) in a survey study of potential chemistry teachers on the initial generic skill profile of prospective teachers in basic chemistry courses includes low-profile generic problem solving skills (54), low critical thinking (40,7), and low communications (45) . Thus, in general, when basic chemistry courses are conducted, students have low generic skill level, while (mean = 46.3) so they need to improve through generic skills-oriented lectures as well as integrating generic skills; basic chemistry lectures. Certainly, before the lecture takes place the appropriate design and intact, learning design integrated generic skills is mediated by problem-based learning.

Besides lecturer and learner components, it is also influenced by lecture component components integrated in the curriculum. Science curriculum should provide many opportunities and rich learning experiences for learners to develop generic skills. Learning science is a process of providing some experience to learners and the process of guiding them to use the science knowledge (Gallagher & Gallagher, 2013). Activity such as scientific investigation, experiments, project, fieldwork, group discussions, debates, which enable learners to be actively involved in the learning process. This is an effective way to motivate learning and develop generic skills (Curriculum Development Officer, 2017).

A 25-year lecturer's experience as well as observations and interviews with several colleagues shows that students are less accustomed to having an authentic learning experience grounded by problem-based learning, so the generic skills expected to carry out their profession are also low. This is evidenced by the results of interviews with chemistry lecturers, they admitted that at the beginning of their duties as lecturers still need additional generic skills. Problem-based learning uses problems as the first step in collecting and integrating new knowledge based on experience in real activity. Problem-based learning is designed to be used on complex issues that learners need in investigating and understanding it. The theoretical and empirical background led the author to argue that we need to develop a model of instructional design that is specific to problem-based learning so as to enhance the generic skills of learners. It aims to create a guide to problem-based learning design to improve the generic skills guiding the author and peers.

In general, this study aimed to specify product development model of problem-based learning design to improve generic skills of learners. Specifically, this study aimed to identify how to construct the components of the problem-based learning design model to improve generic skills as conceptual models, and how to represent components in the form of problem-based learning design models to improve generic skills as conceptual models.

LITERATURE REVIEWS

The design of the concept-based design development of problem-based learning to improve generic skills adopts the type of synthesis procedure of ID model development by Lee and Jang (2014) with type 1. F1-O1-S1-A1 such as Clifford (2009), Moallem (2003) and You (2002) and continued with type 8. F2-O1-S2-A4 such as Spector et al model. (1992). This study was limited to conceptual development generated problem-based learning design concepts to improve generic skills.

Instructional Design Models

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There are several ID models that have been developed such as Reiser and Dick (1996), Zook (2001), ASSURE (2005), Dick, Carey and Carey (2009), Morrison, et al (2011) and ARCS Model (2004). While none of these models are designed for learning with a specific subject. All of these models are designed for general purposes. These models may apply to generic skills oriented chemistry learning while no specific explanation given how models can be used for generic skill- chemistry oriented learning. That is the reason why it is necessary to construct an ID model specifically designed for chemistry learning, with consideration of the objectives and characteristics of chemistry-oriented learning differently generic compared to other learning.

DISCUSSIONS

Sorting the components of problem-based learning design

The problem-based design components and generic skills have been described in the previous explanation. These components are the steps in the implementation of problem-based learning design activities. A learning design should illustrate its advantages and show the actual design task (Gustafson & Branch, 2002). The sequence of components of a problem-based design model for improving generic skills was shown in the following table 1:

Table 1. The sequence of problem-based learning design model components to improve generic skills

NO	Main Components	Sub- Components
1	Need Analysis	Identifying generic skills gaps Analyzing the cause of the gap Taking a conclusion of need
2.	Analyzing learners and learning environment	Identify initial generic skills Identify student characteristics Analyze the learning environment
3.	Formulating learning goals	Define competency standards Determine learning achievement Determine sub- learning achievement Formulate learning experiences Formulate assessment indicators
4	Developing materials	Classify learning materials Provide authentic issues
5	Developing learning strategies	Choose learning methods Develop learning steps Provide intensive training
6	Developing learning media	Develop problem-based learning media Determine alternative media
7	Developing assessment tools	Create a grid of questions Create questions Create an answer key
8	Evaluation	Implement problem-based learning Perform an authentic assessment Revise the learning program

Construct the style of the instructional design model

In this step, a model of instructional design based on the sequence has been constructed from the previous stage. According to Branch and Kopcha (2014), a model is easy to understand if its compilation is descriptive and prescriptive. If there is a relationship described the design process of interactive elements, explained, and showed those relationships, then it was called as descriptive appearance. While it is prescriptive if the model of instructional design can guide, explain the procedure, and generate the right strategy.

There are various illustrations of the design model of learning by exposing its advantages and disadvantages (Branch & Kopcha, 2014; Gustafson & Branch, 1997; Gustafson & Branch, 2002). The rectilinear portrayal design model is widely used for novice designers because of its simplicity, generic and applicable to various contexts. A row of squares is connected by a straight line of arrows with some parallel lines that describe the revision process (feedback). The weakness is too passive, step locked and marching, the implementation of this rectilinear form

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cannot recognize its complexity (Branch, 1997). Branch and Kopcha (2014) asserted by Bichelmeyer, Boling, and Gibbons (2006) suggests that the rectilinear model is unable to provide explanations to novice designers about the learning design process (figure 1).

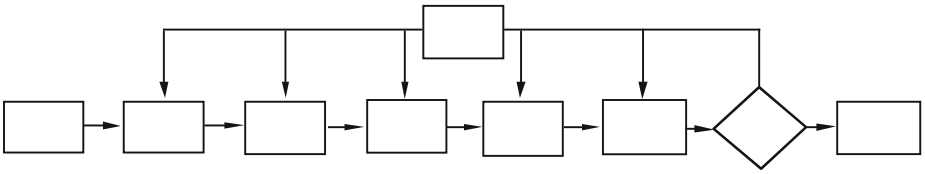

Figure 1: Learning design model (rectilinear portrayal)

Furthermore, *curvilinear* model can overcome the lack of rectilinear shape, this model can be oval, rounded rectangular horizontally and vertically connected by curved lines, two-way arch and the order of components visualized in circular form. Additionally, the advantages to each stage is a linkage so that it can affect each other for the sake of revision and analysis. While the weakness in some stages is still a liner such rectilinear form (picture 2).

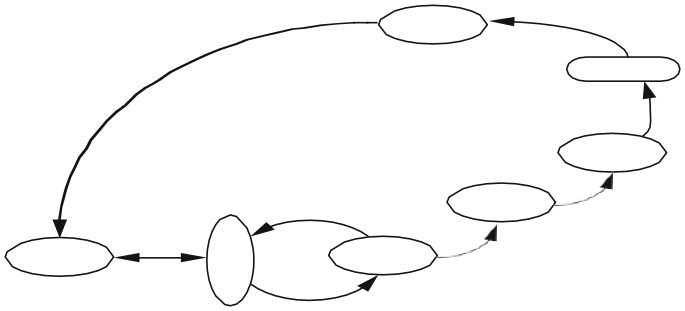

Figure 2. Learning design model of curve shape (curvilinear portrayal)

The third is a nested portrayal design model. This model is different from the previous two models, the model is not linear (figure 3). The advantage of this model is smaller components, clumps and parts of a larger component in one place as if it is nested. This means that certain components can occur simultaneously, not sequentially. It can be said that this form is a combination of rectilinear and curvilinear (Branch & Kopcha, 2014).

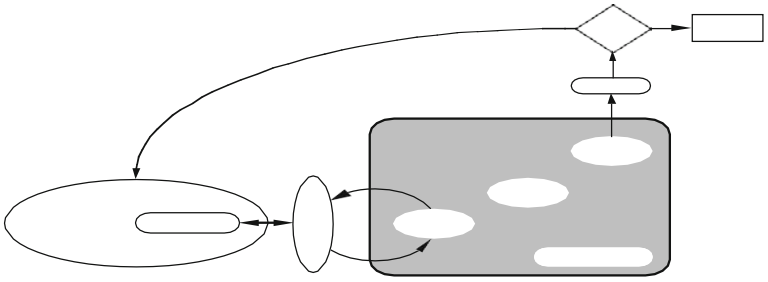

Figure 3: Learning design model of nested form (nested portrayal)

The concurrent shape presents the design stage as a series of overlapping rectangles (figure 1e). This representation is very useful in situations where the design should occur quickly and major design steps must occur simultaneously

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or almost sequentially. Procedures occur simultaneously, or like overlap during the design process, and tend to communicate simultaneous repetitions that characterize the way instructional design is generally practiced (Rowland, 1992; Visscher-Voerman, 1999).

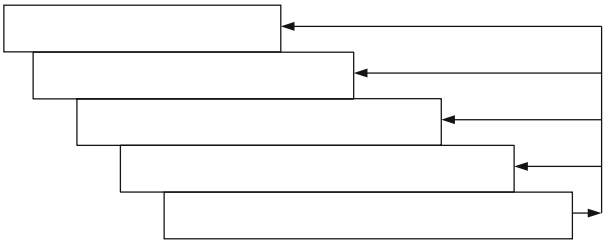

Figure 4: Concurrent design model

Some of the latest models have adopted spiral or recursive designs to show highly iterative nature of the process. This model is used to create rapid prototypes that emphasizes early development of simple and incomplete prototypes and then evolves into a complete design because the problems and types of desired solutions are increasingly evident by developers (Bichelmeyer et al., 2006; Jones & Richey, 2000). The spiral or recursive model is shown in Figure 4 below:

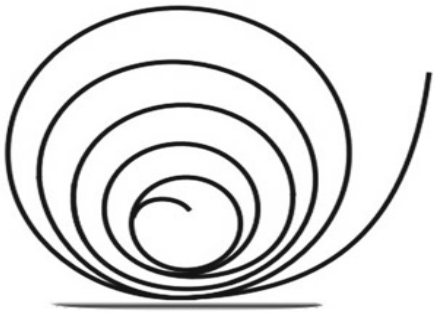

Figure 4: Learning design model of recursive form (recursive portrayal)

Visualization of the Model of Problem-based Learning Design to Improve Generic Skills

Considering the advantages and disadvantages of the model theory, the results of the analysis and the compilation of the sequence of components, as well as the characteristics, the application of the knowledge types, the participants, the characteristics of the learning such as the experience and flexibility of the instructional design model intended. It agrees with Branch and Kopcha (2014) to consider the characteristics of (1) the nature of the situation (2) types of applicable knowledge (3) target audience (4) the nature of learning in terms of curriculum, such as experience (5) the degree of flexibility inherent in the learning model design.

The selected model is a mixture of curvilinear and nested models, arguing that in the early stages of component analysis needs and components analysis learners and learning environments that is an inseparable group or entity in a nested place. Both components are important component to guide the formulation of the objective component, where these components affect each other, therefore need to be given alternating arrows. Component of learning goals play an important role because it is pleased with the success of the program to be achieved. These components are also determinants of subsequent components such as components of developing teaching materials, strategies, media and instruments. These four last- components mentioned are in a non-linear nested box that can be started anywhere. For instance, they start from the development of teaching materials and so on by staying guided by the purpose of learning. The last group is an evaluation component called the learning evaluation group. Thus, it can be said that the model of problem-based learning design to improve the generic skills divided into components of input category analyzed needs, learners and the environment. The components of the process categories are to formulate learning objectives, develop assessments, develop learning strategies; develop learning materials and develop learning media. The component falling into the category of output is evaluation.

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The considerations mentioned above are supported by Gustafson and Branch (2002). There are nine characteristics of design model preparation: (1) the type of outcomes associated with the preparation of the lesson; (2) the resources to develop; (3) represents business in the form of groups or individuals; (4) skills and experience in designing expected lessons from individuals or teams; (5) most teaching materials will be selected from existing sources or represent original design and production; (6) the number of preliminary analysis performed; (7) anticipate the nature of technological complexity in the development environment and delivery system of learning; (8) the number of trials and revisions, and (9) the amount of dissemination and follow-up occurred after the construction process.
Visualization of the problem-based learning design model to improve the generic skills is shown in Figure 5 as follows:

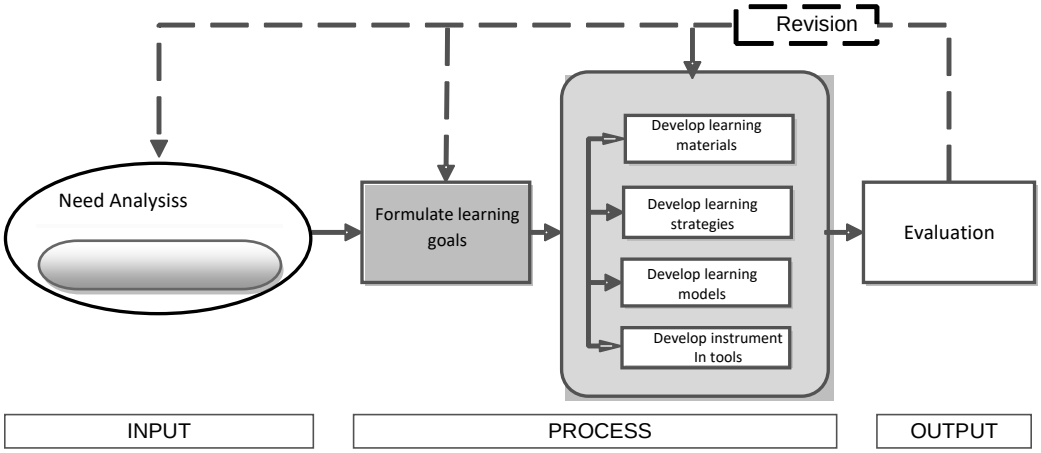

Figure 5: Model of problem-based learning design to improve generic skills

CONCLUSION

The procedure of drafting the concept of problem-based learning design model to improve generic skills was explained as; 1) determine relevant instructional design models, following the factors influenced such (a) determine the categories of instructional design models (b) analyze the advantages and disadvantages of learning design models with class-oriented categories, products and systems. 2. Analyze the components of learning design model, with steps comprised; (a) determine the reason for selecting nine learning designs, (b) summarize the components of the instructional design models that have been analyzed, (c) analyze each component of the learning design model into matrix form, (d) select components from a combination of nine learning design models. 3) Construct the components of the learning design model based on the results of the analysis in the previous stages. 4) The order of components and the form of problem-based design model. In order to determine the order of the components of the constructed design model, it takes a style or model visualized the characteristics of the components by; (a) sorting the problem-based learning design components, (b) visualizing the model of problem-based learning design to improve generic skills.

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THE EFFECTIVENESS OF INTEGRATED AND SELF DIRECTED LEARNING SOFTWARE ON STUDENTS' MOTIVATION

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ABSTRACTS
This study aims to identify the effectiveness of integrated and self-directed learning on students' motivation. The content of the software used in this study involves the usage of interactive learning and self related aspects of problem solving, information processing and cooperation. Motivation in this study refers to the intrinsic and extrinsic motivation for learning English. This research is a quasi experiment involving 120 samples which 60 were experimental group and another 60 were control group, comprised from four secondary schools in Indonesia. Data was collected through questionnaires distributed and the results of MANOVA tests conducted found that there were or are significant differences in terms of intrinsic motivation and extrinsic motivation among students who were exposed to integrated and self-directed leaning. Hence, this implies that the integrated learning and self-directed learning is suitable to be applied by teachers in the pursue to improve students' motivation in learning to read English sentences in line with the 21st century learning.
Keyword: integrated learning, self-directed learning, intrinsic motivation, extrinsic motivation

INTRODUCTION

Language plays an important role in sharing feelings, wishes, opinions, thoughts, ideas, knowledge, information, understanding other people and many more conveyed via verbally or insribed (Ahmad & Sulaiman, 2015). English is a well established international language which must be mastered in order to develop ideas and gain knowledge in larger environment. Therefore, most countries uphold English language to be taught as a second language in educational institutions.

Students' competency in English language is still weak despite the government effort which introduced English language as a second language in countries such as Indonesia and Malaysia (Gill, 2002). Although English is a compulsory subject for all students ever since their lower primary school, most secondary school students are having difficulties to speak English fluently (Dash, 2013). Reading English materials is one of the best methodologies which can be employed by the teachers to help their students to master English. Hence, it is imperative for students to master reading skills from early stage of their education. Reading habit should be inculcated in order to build a strong foundation for their reading ability (Mahmoud, 2013). However, to make reading a habit, students must have a high motivation which can drive them to practice the routine.

English Language has always played a significant role in Indonesia in its pursue to become a developed nation. Thus, in Indonesia, English is one of the lessons that must be studied by all students ranging from junior high school students to undergraduates. However, an ample number of students still could not use English to communicate and only a small number of them can write in English (Ras, 2011). Among the four English skills (listening, speaking, reading and writing) which are integrated in the curriculum of English in high school, reading skill is a priority as this is the foundation which allow students to be further equipped with the rest of the skills.

Accordingly, to improve reading skills in English, learning strategies should be fun and exciting. Richards (2009) states that technology accelerates the process of language learning. Thus, the interactive learning is the best alternative in helping students to master reading skills in learning English Language. Integrated and self-directed learning is a medium for alternative teaching in order to improve students' reading skills and enhance their motivation for learning English (Wagman, 2005). Gardner (1985) believes that students with high level of motivation will be more successful as compared to those without motivation.

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LITERATURE REVIEW

Integrated And Self-Directed Learning Software Integrated and Self directed learning software in this study involves problem solving, information processing, and cooperation. This integrated and self-directed learning software is a scaffolded learning structure which uses links to important resources from the World Wide Web. One of the authentic function is to motivate students to investigate open questions, the development of individual skills, and participation in society (Awang et al., 2013). This software is also investigative-oriented where some or all of the information required by students come from Internet sources. It consists of six major components, namely the introduction, task, process, resources, evaluation and conclusion.As a result of integrated and self directed learning experience, students are able to analyze an in-depth knowledge and can demonstrate an understanding of the learning material. This is consistent with the opinion of Brem and Boyes (2000) which state that this learning method helps both students and teachers to developng skills in knowledge acquisition. However, the materials that were developed in this integrated and self directed learning software must conform to all levels of capabilities in the classroom and on the basis of content-based learning (Wagman, 2005; Laborda, 2009).In addition, a study by Noordin and Razali (2008) which was conducted on Malaysian students pursuing TESL program also revealed that the users of the software have a positive perception. They noted that self directed learning software is beneficial in learning English as it have meaningful activity, authentic, motivating as well as supporting cooperative learning. In addition, the software also foster critical thinking skills (Noordin & Razali, 2008) and support constructivism principles in language teaching (Matusevich, 1995; Reeves et al., 2002; Matejka, 2004; Baccarini, 2004). This shows that the students can enhance their creativity and promote self-learning technology if used effectively.

Intrinsic and Extrinsic Motivation Towards Learning English

Motivation is generally acknowledged as important in second language (L2) learning. It is classified into two types; intrinsic and extrinsic. Intrinsic motivation, commonly associated with integrative orientation, refers to the desire to perform an action without exertion of external inducement or reward (Bandura, 1977). Extrinsic motivation, which is usually associated with instrumental orientation, is a learner's desire for achievement to get an external reward (Pittman & Boggiano, 1992). A student was said to have the motivation to learn if his level of involvement and diligence is high in study as well as complete the assignments given. Motivation to learn is essential in the process of teaching and learning in schools in order to improve student achievement, especially when it comes to reading skill in English language.

Motivasion is influenced by myriad factors such as the characteristics of learning, learning, learning capabilities, learning environments, and the ability of the teacher to handle the learning process for students (Dash, 2013). Thus, the teacher's role is important in increasing students' motivation. Among the strategies that can be done by teachers to improve students' motivation is to plan learning activities wisely to prevent boring session as well as allowing information and ideas sharing, giving the students opportunity to choose activities which interest them. This weill ensure the students to engage in activities and presentations relevant to the teaching and learning materials (Kim, 2011).

Purpose of the study

This study aims to identify the effectiveness of integrated and self directed learning on students' motivation. The content of the software used in this study involves the usage of interactive learning and self-directed learning which related to the aspects of problem solving, information processing and cooperation. Motivation in this study refers to the intrinsic and extrinsic motivation towards learning English.

METHODOLOGY

Research Design and Sampling

This research is quasi experiment involving 60 samples as the experimental group and 60 as a control group comprises from four secondary schools in Indonesia. Data for this research were obtained from questionnaires. MANOVA analysis was used to compare the intrinsic and extrinsic motivation among students taught with the conventional method based on their ability.

Respondents in this study were selected based on purposive and random sampling. In this study, researchers were unable to carry out random sampling to select students in the experimental group and the control group. This is because the school administrators only allow the use of existing groups of students in the class. After getting two

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schools sampled, researchers will then randomly select eight classes of Form Two students available to be used as the experimental group and the control group; four classes of the experimental group and four classes for the control group. The study involved Form Two students in their first semester as they are expected to easily accept the transformation of teaching and learning using integrated and self-directed learning. After the election, eventually 60 students were place in the experimental group and another 60 students were used as a control group from all four selected schools in Indonesia.

Research Instrument (Students Motivation Questionnaire)

Questionnaire items on motivation that were used in this study was adapted from Anita Wenden (1991) and Little (2000). Students motivation is made up of intrinsic as well as extrinsic motivation. Questions on both intrinsic and extrinsic motivation consist of 26 statements. The questionnaires that were used to measure intrinsic motivation of students to read English materials include motivation aspects that comes from within the student: (1) the encouragement and the need to learn comes from yourself; (2) trying to improve understanding; (3) capable of facing any challenges and have confidence in myself to succeed; (4) engage in various activities to enhance understanding; (5) high interest in learning without being influenced by others and (6) apply reading comprehension skills in everyday life depending on my capabilities

Students' extrinsic motivation is related to the motivation aspects that come from outside of the student: (1) the encouragement and support from friends, parents or teachers; (2) presence of award and hope in the study; (3) conducive learning activities, family and school environment; (4) in the needs to catch up with time and technology; (5) activities with friends and teachers. For validity, Cronbach alpha values for intrinsic motivation is .951 while the Cronbach alpha value for extrinsic motivation is .861.

Data analysis

RESEARCH FINDINGS AND MOTIVATION

Students' Intrinsic and Extrinsic Motivation Based on teaching Methods

Table 1: The level of students intrinsic and extrinsic motivation based on teaching methods

Variable	Teaching Methods	N	Mean	Standard Deviation
Intrinsic Motivation	Experimental	130	4.36	0.199
	Control	130	4.12	0.311
Extrinsic Motivation	Experimental	130	4.31	0.169
	Control	130	3.98	0.334

Based on Table 1, the level of intrinsic motivation for students involved in teaching methods based on integrated and self-directed learning is much higher (mean = 4.36, S.D = 0.199) as compared to students using conventional methods (mean = 4.12, S.D 0311). Similarly, the extrinsic motivation where students are being taught using integrated and self-directed learning is also higher (mean = 4.31, S.D = 0.169) than the students taught using conventional teaching methods (mean = 3.98, S.P = 0.334).

Students who learn using integrated and self directed learning have higher intrinsic and extrinsic motivation than students who learn using conventional methods. This suggests that intregrated and self directed learning method can signifcantly improve both intrinsic and extrinsic motivation among students. Integrated and self directed learning software provides the usage of technology in teaching concepts and methods which appeal to the students (Ahmad & Sulaiman, 2015). In addition, the activities provided also lead to active participation of students in teaching and learning session. The finding is consistent with studies conducted by Camara et al. (2013) which revealed that there is an increase in motivation among students who learn using computer. Increased motivation is probably due to the use of integrated and self directed learning which act faster in shaping students' knowledge continuously which linked to their existing knowledge (Chang et al., 2011).

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Intrinsic And Extrinsic Motivation Among Students Taught Using Integrated and Self Directed Learning Software As Compared to Conventional Method Based on Students' Capabilities

MANOVA analysis was carried out to identify the differences in intrinsic and extrinsic motivation of students taught using M-WQ as compared with the conventional method based on the student's ability. Before manova analysis was conducted, the researchers first carried out a test to determine the homogeneity of the variance-covariance matrix using Box's M test. Box's M test analysis can be seen in Table 2 below.

Jadual 2 Box'M Test for Differences in Intrinsic And Extrinsic Motivation Among Students Taught Using Integrated And Self-Directed Learning Software Compared With Conventional Method Based On Students' Ability

Box's M	F- Value	df1	df2	Sig.
71.896	4.685	15	155737.785	0.002

Table 2 shows that there is no significant difference in variance-covariance among the dependent variables for all level of independent variables with the value of Box's M = 71,896 and Sig = 0.002 (p> 0.001). This means that the variance-covariance of dependent variable is homogenous across the independent variables. Therefore, MANOVA tests can be performed to see the difference in intrinsic and extrinsic motivation of students taught by using integrated and self-directed learning software as compared with the conventional method based on the students' capabilities (Pallant, 2007).

Jadual 3 Wilks' Lambda Value for The Differences in Intrinsic and Extrinsic Motivation On Students Taught Using M-WQ Compared With Conventional Method Based On Students' Ability

Effect	*Wilks' Lambda* Value	F Value	DF between groups	DF in group	Sig
Teaching Strategy	0.720	49.109	5	254	0.000
Ability	0.951	3.206	5	254	0.013
Teaching strategy*Ability	0.977	1.467	5	254	0.211

Table 3 shows that the Wilks' λ value= 0.720, F (5,254) = 0.000 (p <0.05) which implies that there are significant differences in students' motivation when taught with different methods of teaching. The findings also indicate that there are significant differences in student motivation based on their ability with the Wilks' λ = 0.951, F (5,254) = 0.013 (p <0.05). This study is in line with the findings by Kurtulus and Kilic (2009) which stated that the use of M-WQ can improve students' involvement in classroom activities as well as brainstorming ideas and sharing those ideas with friends.

However, there was no significant interaction between teaching methods and students' ability in learning motivation with the Wilks' λ = 0.977, F (5,254) = 0.0211 (p> 0.05). In terms of mean, it shows that students who being taught using integrated and self-directed learning method has higher intrinsic and extrinsic motivation than students who studied with conventional method as portrayed in Table 4.

Table 4 below shows that based on the results from treatment group, the students with high capabilities (mean = 4.46 and SD = 0215) have higher intrinsic motivation than their peers with moderate (mean = 4:34 and SD = 0.189) and low abilities (mean = 4:28 and SD = 0.159). Next, the results from control group shows that students with moderate

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(mean = 4.15 and SD = 0322) and high ability (mean = 4.11 and SP = 0.284) have higher intrinsic motivation than the student with lower ability (mean = 4.08 and SD = 0.319). Overall results revealed that students in the experimental group (mean = 4.36 and SD = 0.199) have higher intrinsic motivation than students in control group (mean = 4.12 and SD = 0.311). Based on the cabilities aspect on the other hand, the results show that the students with high ability have higher intrinsic motivation (mean = 4.29 and SD = 0.307) compared with those with medium (mean = 4.24 and SD = 0.280) and low ability (mean = 4.18 and SD = 0269).

Based on the extrinsic motivation of students in experimental group, the students with high ability have higher extrinsic motivation (mean = 4.33 and the SD = 0192) compare to their peers with medium ability (mean = 4.31 and SD = 0163) as well as those with lower ability (mean = 4.30 and SD = 0.160). Moreover, the results of extrinsic motivation from control group reveales that students with medium (mean = 4.03 and SD = 0327) and low ability (mean = 3.95 and SD = 0.333) had higher extrinsic motivation than students with high ability (mean = 3.92 and SD = 0346). Overall results indicates that students in experimental group (mean = 4.31 and SD = 0.169) have higher extrinsic motivation than students in the control group (mean = 3.98 and SD = 0.334). On the ability aspect on the other hand also showed that the students with medium ability (mean = 4.17 and SD = 0.292) have higher extrinsic motivation compared to the students with high ability (mean = 4.13 and SD = 0.347) and their peers with low ability (mean = 4.13 and SP = 0.312) ,

T**able 4:** Intrinsic and extrinsic motivation level based teaching and students' Abilities

Variable	Teaching Method	Ability	N	Mean	Standard Deviation
Intrinsic Motivation	Experimental	High	32	4.46	0.215
		Moderate	66	4.34	0.189
		Low	32	4.28	0.159
		Total	130	4.36	0.199
	Control	High	32	4.11	0.284
		Moderate	66	4.15	0.322
		Low	32	4.08	0.319
		Total	130	4.12	0.311
	Total	High	64	4.29	0.307
		Moderate	132	4.24	0.280
		Low	64	4.18	0.269
		Total	260	4.24	0.286
Extrinsic Motivation	Experimental	High	32	4.33	0.192
		Moderate	66	4.31	0.163
		Low	32	4.30	0.160
		Total	130	4.31	0.169
	Control	High	32	3.92	0.346
		Moderate	66	4.03	0.327
		Low	32	3.95	0.333

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Variable	Teaching Method	Ability	N	Mean	Standard Deviation
Intrinsic Motivation	Experimental	High	32	4.46	0.215
		Moderate	66	4.34	0.189
		Low	32	4.28	0.159
		Total	130	4.36	0.199
	Control	High	32	4.11	0.284
		Moderate	66	4.15	0.322
		Low	32	4.08	0.319
		Total	130	4.12	0.311
	Total	High	64	4.29	0.307
		Moderate	132	4.24	0.280
		Low	64	4.18	0.269
		Total	130	3.98	0.334
	Total	High	64	4.13	0.347
		Moderate	132	4.17	0.292
		Low	64	4.13	0.312
		Total	260	4.15	0.311

The findings indicate that students with high ability have a higher intrinsic and extrinsic motivation than students with medium and lower ability. This urges the increment in the usage of technology by the teachers in conducting English lesson as well as ensuring that students with various level of abilities are capable to master and equipped with good skills in conducting the technologies. Supporting the opinion in Yin (2009) which states that teachers and educators should pay more attention to the situation in which technology can be used effectively by both teachers and students in the classroom in learning language. The use of the technology has been proven to enhance learning English in line with the study by Mahmoud (2013) which found that students who practiced *Short Messages Service* (SMS) with their teachers noticeably improved their writing and speaking performances.

CONCLUSION AND IMPLICATIONS

This study successfully adapted the use of integrated and self-directed learning software to enhance the intrinsic and extrinsic motivation among students on their achievement in English reading comprehension. The finding also supports theories of learning and motivation in improving student achievement. Therefore, integrated and self-directed learning software can be applied by teachers in their goal to improve students' achievement in the English language. This approach can also be integrated as a suitable alternative approach if direct interaction in classroom can not be conducted due to some constraints.

Integrated and self-directed learning software can help English teachers in applying information technology into their teaching strategies. The use of integrated and self-directed learning in teaching software can relieve the the work burden of teachers as well as capable to increase their creativity in teaching and learning activities in the classroom. This is due to the minimum involvement of teacher in using integrated and self-directed learning software. Integrated and self-directed learning software may also be served as a source of reference for various parties in order to construct various web sites to improve the skills of teachers in using technology in education in accordance with the present era of information technology. The ministry can play a role by providing courses to train teachers especially

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English teachers in applying integrated and self-directed learning in teaching and learning processes which aligned with the curriculum specification.

Further studies can be done involving students with various levels in the use of integrated and self-directed learning software in teaching reading skill in English language to get more detail information about the use of integrated and self-directed learning software. Demographic studies involved in this study should represent various characteristics of students, such as gender, location and family income. It aims to identify whether demographics aspect might be an influencing factor in the usage of integrated and self-directed learning software. In addition, the effectiveness of integrated and self-directed learning software should alse be viewed from various aspects. The effect can also be seen from myriad variables such as students' knowledge, usage and skills in the usage of the learning software. The results in this study make practical sense and are coherent with instructional and learning theory, as well as motivational theory.

This study successfully adapted the use of integrated and self-directed learning software to enhance the intrinsic and extrinsic motivation among students on their achievement in English reading comprehension. The finding also supports theories of learning and motivation in improving student achievement. Therefore, integrated and self-directed learning software can be applied by teachers in their goal to improve students' achievement in the English language. This approach can also be integrated as a suitable alternative approach if direct interaction in classroom can not be conducted due to some constraints.

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THE HORIZON OF CONNECTIONS BETWEEN MATHEMATICS AND ART: OBSERVATIONS FROM A TEACHER EDUCATION COURSE

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ABSTRACT
Since the 2004 spring, mathematics and art course has been formed for pre service math and science teachers of primary and secondary level. This paper includes a summary of the feedback from the implementation of this course and of what we have learned from connections and their effects on mathematics learning. Students showed increased appreciation for mathematical art and increased mathematical thinking skills. Every student left the course with a portfolio. They could interrogate their artefacts with their classmates. They built and saw 3D models of platonic solids via modular origami. Their thinking and reasoning with abstract mathematics extended beyond what can be seen as in 4D. They reasoned about geometrical relationships as an expert mathematician. Patterns flourished as when they were least expecting. Seeing became multi-dimensional. Connections led to some emerging themes from the course gains as imagery, visualization, representations, cognition and connectionist models, patterns, mathematical thinking.
Keywords: mathematics and art, origami, fractals, patterns, dimension

1.0. INTRODUCTION

There is a workshop series that has been running for the last decade and lasted by two extraordinary academicians: Dr. Annalisa Crannel and Dr. Marc Frantz. I encountered with their Viewpoints 2003 workshop (Crannell, Frantz 2011) invitation while I was lost via very interesting connections over the Internet. While this paper is not only on what they do, since the whole idea is based on what I have learned from that workshop, it would be very fair to start with their ideas. One of them being a very sensitive mathematician and the other being a diverse mathematician with an artistic background, they were very successful in developing a huge enthusiasm with an intellectual spark within us that I will appreciate for the rest of my life. They had the passion for what they were doing and they let us have at least a part of it as well.

In that workshop, we have learned on one point/ two point perspective and how we should view art with that knowledge at hand, fractals; how we could generate them, what they are based on (iterations, self-similarity, and very distinct dimensions), modular origami (from a workshop attendant who had a passion to disseminate the idea of origami to all parts of the society), photography, animations and the use of perspective among them, and last but not least was the appreciation of art that we have mastered tremendously. At the beginning, their course notes were helpful in generating new course material.

1.1. The course

The name of the course was a direct application of the two most important things in this course: mathematics and art. Although the name of the course remained constant throughout two universities that we have given this course, and throughout the very large number of students, the contents changed from time to time due to the shift in my interest. Throughout the years more universities provided courses on these topics in Turkey; fractals course on Karadeniz Technical University, Origami course on Başkent University, Paper folding course at Gazi University and the course with the same title “Mathematics and art” in Dokuz Eylül University(Ugurel, Tuncer, Toprak, 2013). Although this paper will focus on our course, it is a must that we should say that it became like a trend. The course name was “SCED 486: Special Topics in science and mathematics teaching course started to be known as “Mathematics and art”. The course had some students who had diverse backgrounds like art and pure mathematics but mainly due to the time and place constraints, and giving this course to only 25 students at most each time (besides one time to 90 students in a separate university), some preservice elementary teaching students and also some students from arts and sciences faculty were able to take this course.

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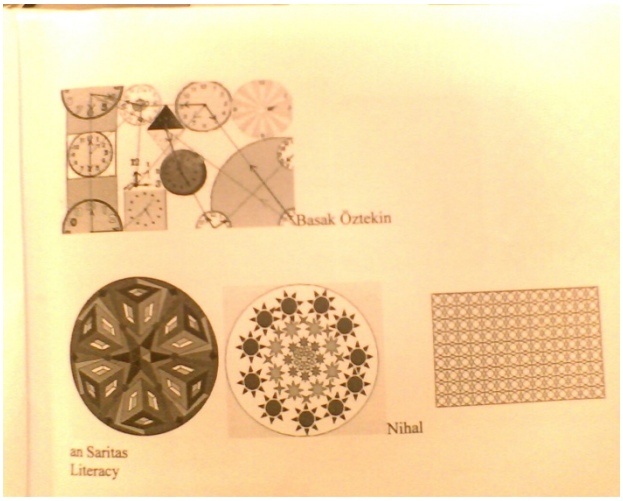
Fig 1. Example of student artefacts



The course was on *connections.* Connections that shape mathematics, connections that shape art were the main course outline. However, students were the main locomotives of the course. They have created, they have analyzed, and they have interrogated (figures 1,2,7,8,and 9). They have even helped us to develop the course. Each semester, I have used what we have gained from the students in the previous semester regarding the new connections, the connections overheard, or the connections just ignored. In the last semester, the contents of the course even included some excursions into the mathematics to deal with some anxiety and fear problems related with mathematics itself.

Students' enthusiasm reached to the staff of the department and they even became a part of a presentation of modular origami and kirigami (art of cutting paper) demonstration to the whole university on the Teachers' day. Connections were created; connections were developed via students' minds.

For the assessment part, some criteria were established as creativity, harmony, the degree of mathematics embedded /used, aesthetics, modularity, difficulty, etc. In semester where we have taught this course in Marmara University, we have included also another part that we have not before. We have made the students to assess each other's work with the criteria that we had. We have made use of the differentiated instruction so that students were able to bring a developed model of what they were interested in. Some of the students chose to go one point ahead of an excursion; some students created a copy of an artistic expression and some students chose to develop an original piece of their own.

Fig 2. Example of student artefacts

After the first year, instead of a stable course format, we have designed the course with respect to what the students brought to the class. That is students who were good at computers helped us to see how we could use computers to generate images that could challenge everyone to think what messages they could be carrying out. Musician students helped us to see different ways to be a musician with interesting musical instruments, with notes and without notes, and only being interested in patterns. Hence, we chose to use a dynamic course material

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with flexible format in each different semester. We have used art to learn math and we have used math to learn art.

1.2. Art and Mathematics: Connections across…

Only some pure mathematicians like Poincare believed that it includes aesthetics as its soul. Mathematics is known to be a cold course which lacks sympathy, which lack emotion. Hence, it becomes less understandable and less achievable. But the reason is esthetic, sympathetic, and pedagogical side is less considered while teaching (Dursun, 2012). Dursun (2012) also mentions about the necessity to give minimal exactness (nothing unnecessary is included) and maximal benefit (since it is simple but it can be used in everywhere). In the course, unnecessary connection is decided by its following connection. For example, golden ratio is not left by its definition or by the sunflowers but its sequential importance of powers is searched and new connections are achieved.

The course is not for their eyes only, but also for those who are the true searchers of the beauty of mathematics. The name of the course lacks to give its possible richness of the topics that could be mentioned. In the literature, most of the connections between mathematics and art were already discussed in full but there are some new issues or some new areas that deserves full attention. These new connection areas may provide new horizons not only for the teachers but also for their students. Fractals, origami, mathematical poetry, animations, Islamic patterns, crotchet, quilts are some of them. There are also other topics such as perspective, collage, painting, mathematical 3-D modeling, advertisements, graphical design, illusions, etc.

The literature on mathematics teacher education states that when teachers are given a chance to think mathematics as art, they tend to teach mathematics with esthetics and with caution. Some teachers may already have beliefs related to math as art then all they need is a starting point (Baydar, & Bulut, 2002). National Council of Teachers of Mathematics of USA (NCTM, 2000) mention mathematics education should employ mathematics as art. Similarly, our curriculum for both elementary and secondary math education aims students making connections between math and art and development of their sense of aesthetics. Not only mathematics curriculum but also geometry curriculum asks for connections to be built between square, pentagon, hexagon and art. In 10^{th} grade and in the previous grades all geometric connections are flourish from Turkish Islamic patterns(Ugurel, Tuncer, Toprak, 2013). In their study, they have studied 43 preservice teacher from secondary education. Out of these 27 of them were able to make connections in their prepared lesson plans on mathematics and art connections as good or medium. They have used case study method with some descriptive statistics and it looks like a one and only study on this subject regarding some numbers. From the students' written lesson plans, fractals, mostly used referring to sequences and infinity concepts, golden section is used in sequences, sets, functions, and specifically on the squares. Escher's art on impossibles is used for paradoxes, 2D/3D or for limit and infinity (Ugurel, Tuncer, Toprak, 2013). As a result, preservice teachers' connections are left in a restricted area. Ugurel, Tuncer and Toprak proposed (2013) inter disciplinary approach for mathematics education and lesson plan development with teachers are necessities.

Most of the aforementioned constructs are known for centuries but the connections are forgot to be pointed for a very long time and people started to think that these are all but nothing to do with mathematics. As a matter of fact, even people who are good at these art constructs believe that they do not employ mathematics or they could not be able to do mathematics on their own. In this manner, it is conjectured that if we can educate at least some teachers on these connections this could help both to the lowering of the anxiety level towards mathematics and also help new generations to use more *mathematical themes* as well as some mathematical considerations for the advancement of these art constructs. The mathematical themes that emerged over time follows: imagery, visualization, representations, cognition, patterns, and mathematical thinking.

1.2.1.Imagery; Platonic solids (figure 3) are mainly five polyhedra that Platon iniated: tetrahedra, cube, octahedron, dodecahedron and icosahedron. We have started using sonobe modules to generate a cube (six modules), then we demonstrated stellated dodecahedron (in which each face was having a pyramid on it) and stellated icosahedron with many sonobe module variations. Students were able to compose different polyhedra with various modules. First, they worked in groups, and then they worked independently. Imagery came into the situation where some of them went beyond intended and asked questions like "*what happens when….*" or "*what is the next step if we build something like this…*" .

Reasoning with the numbers of corners, sides, faces and dissection of polyhedra gets easier with the modular origami pieces at hand. Students drew impossible figures and analyzed dimension construct. Perspective drawing on given lattices was experienced with these figures. Some of the students used this chance to color and visualize the 3D in 2D. These tasks became ill-defined tasks for them to reason mathematically.

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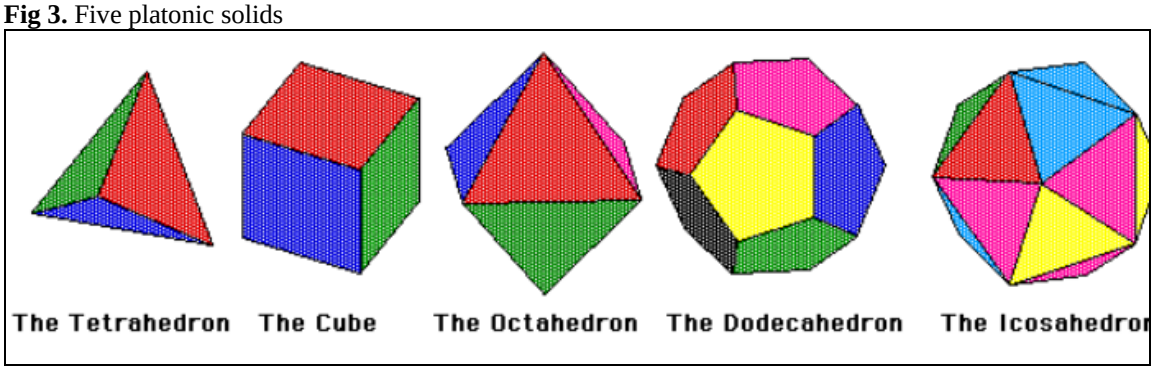
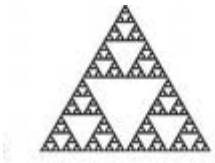
Fig 3. Five platonic solids



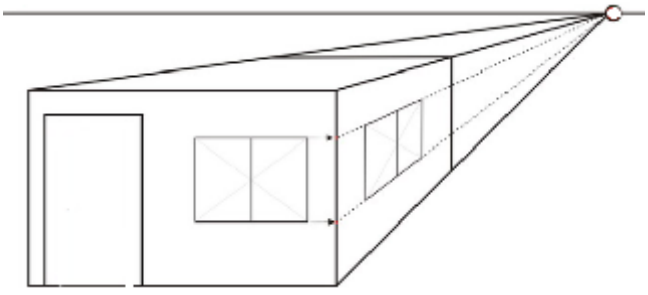
Fractals are mathematical shapes of the chaos theory. A fractal is a self-similar figure with iterations and a special dimension. They have taught us that dimensions can be decimal numbers, nature has a written mathematics underneath, fractal generation is a creative yet calculated manner etc. Students imagined connections that happen without intentions. For example, if we color even numbers in Pascal's triangle, we end up with Sierpinski triangle (figure 4) pattern. It has a Hausdorff dimension of (log3/log 2). Another fractal creates a tree shape when initiated from Phytagorian proof. These types of connections are imagery sharpeners, and they help students see what they have not noticed before. Karakuş (2010) proposed the same thing with preservice teachers on 3D fractal cards which enable dimension concept development.

Fig 4. Sierpinski triangle



1.2.2. Visualization; What we see is not what we get from mathematical connections. They are everywhere. Students need to be trained to be able to see what is hidden and not easily visible. For this reason, mathematics pathways should be a topic for lifelong learning. Here, perspective topic helped us. Technical drawing made us to see it from front, back and sides. Perspective with one vanishing point made us see it from a corridor, perspective with two vanishing points made us see it within a building corner and outside of a building corner (figure 5). We saw buildings, paints, tiles, boxes, from different perspectives. Putting in a perspective is just a transformation with points in three dimensions. Hence, we faced with the transformational geometry as a connection.

Fig 5. One point perspective



1.2.3.Representations; We have used origami and special techniques of paper folding to represent things that we cannot show otherwise. Four dimensional space and beyond is a question for many preservice mathematics teachers. Non Euclidean spaces (spaces or subspaces where Euclid laws do not work) are not easy to be seen as well. With one corner of them attached, we have inserted one more triangle to six triangles within a hexagon. Similarly, we have glued hexagons to a heptagon sides and saw how the surface was made of hills and depths. With crocheting (if we increase one knot by double in each row), we can represent hyperbolic surfaces of non-Euclidean space by visuals. In the figure below, paper hyperbolic surface is created by folding a square paper from its diagonals and folding from its grids one outside one inside on each produced triangles inside (fig 4).

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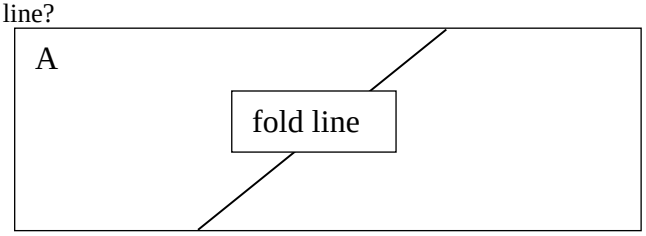
Similarly, we can cut stripes from concentric circles with the same thickness and we can glue them one outside one inside next to each other to experience another non Euclidean space. Baki (2001) argues that Euclid geometry is not helpful to teach theoretical and physical world by itself at the same time. Non Euclidean geometries on the other hand give the opportunity of shapes of mountain lines, or the branches of a fern or the curls of clouds and snowflakes.

Fig 6. Figures of non-Euclidean spaces

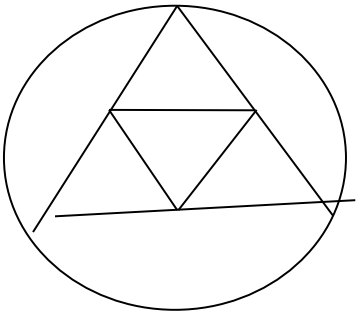
crotcheting and paper folding creates non-Euclidean spaces

1.2.4.Cognition *and the connectionist models***;** In most of the activities, we have chosen the ones that intrigue mathematical reasoning most. *Origamics* (Haga et al 2008) is a branch of origami which deals with some interesting folds and the mathematical connections achieved. Some questions are asked in well known journals like Bilim ve Teknik in Turkey.

Question: If we fold two opposite corners of a rectangle paper (A and B), what is the length of the resultant fold line?



Question: how we can transform a circle into a half cone?



These questions produced an array of answers, and they produced more than one parallel answers. Interesting fact was students' different reasoning styles and the way we were able to see it from their array of answers. Research on these answers will follow this paper immediately. Cognitive theories of learning stress the algorithm and concept learning(figure 6). With these two questions and with many more examples, students identify different possible algorithms and interrogate concepts like rectangle, diagonals, sides, angles, similar angles, circle, angles in a circle, prisms, height of a prism, etc.

After a while, students create their own questions as well. These types of questions are also the requirements of the recent curricula since they ask for reasoning with patterns, identifying connections between different concepts and problem formation.

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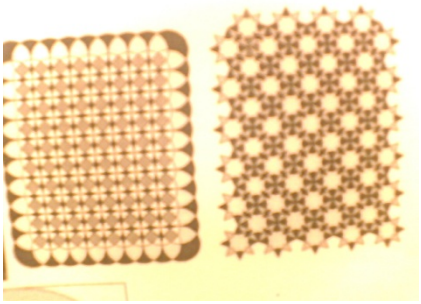
Fig 7. Student made crotchet helix

1.2.5.Patterns; Nature is a great source of patterns. Fibonacci numbers are on sun flower's seeds. But they also produce a series that associates with the golden number (1,618). With the powers of the golden number, we have encountered with a mathematical series that connects to Fibonacci numbers. We asked for what may come next? Or where it connects to? And even, some inductive proof came into the consideration.

Fig 8. Student made helix

Fig 9. Student made patterns



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Patterns on the doors, windows, and buildings of Islamic architecture is at first amazing, and they flourish connection with the geometry of triangles, squares, rectangles, plane division problems and even with plane symmetry groups (Schattschneider 1978). 17 wallpaper groups of Alhambra Palace help us to deal with dimension concept via impossible solid figures of Wiltshire (1997). Hand crafts carry an array of special examples of connections. For example, they can help us to analyze the spirals, helixes.

1.2.6.Mathematical thinking*;* Mathematics should be taught emphasizing mathematical thinking and reasoning as a process. This view has been mostly supported by recent mathematics education standards and mathematics education researchers. Even new curricula stress the importance of making students think like a mathematician (Turkish Ministry of Education 2005). Process rather than product and content are stressed (Mamona-Downs, & Downs 2002). Burton pointed to mathematicians thinking in terms of the big picture and with using the connectives and reflecting on structure (undated, cited in Mamona-Downs, & Downs, 2002).

2.1.HYPOTHESIS AND METHODOLOGY

In this longitudinal study, it was hypothesized that a course like this could create awareness towards connections between art and mathematics and with other branches. In addition, it was thought that understanding that there is an infinite array of connections could foster more need to master mathematics and more need to be exposed to art in general.

Although, it is hard to see the results of the course material on students since they are disseminated worldwide after their graduation from two universities that this course was given. This course material grew by itself over the time. More connections are revisited, more connections are recognized. But above all, I as the teacher of this course and as the primary student of this course became the most interesting product of this course. In this paper, I will also state some side products that came with me as in the form of increased understanding of learning by connections and mathematical reasoning formation before, during and after the artifacts that are created by what we learn from this course throughout the years pass by.

It is a longitudinal study since it has been over the course of many years. It is also a case study since as each student teacher and their unique products could be named as different cases, me as both the teacher and the student of this course could be taught as a case for learning by connections revisited.

2.1.1.The course outline

Not all but some art uses mathematics as its structure. *Fractal art* is the collection of all images that are generated by hand or by computer and which corresponds to the some specific complex and iterated functions. *Perspective* can be distorted and this may give us some ways to analyze TV news, advertisements, etc. As much as there is false perspective which is generated by distorted one, there is also true but unexpected perspective as in the case of relative look into an object and with different types of object (sphere, cylinder, etc.) There is one point, two point and there point perspective and studying them may help understanding the connections between architecture, mathematics and art. Foundations and basic folds of *origami* is followed by *modular origami* (figure 10) to see the part whole relations, to investigate the five platonic solids and their variations (Erktin 2005). As the years pass by, we reached to a point where we needed to understand more of what we produce. And *origamics* became an intensive part of the course, so that a new course can be formed from its artifacts and reasoning manners. *Musical notes* are in progression of equal *tone* intervals. In each division, there is the same measurement of notes, and they are a good resource of reasoning with decimals, and rational numbers. Creation of *poems* about mathematics is fun, on mathematics is challenging, and of mathematics is a light of *structuralism* inside.

Fig 10. Modular origami (Sonobe modules and miscellaneous modules)

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From the poem of Nazım Hikmet(1901-1963) ;
"This is the last day of your journey, last!
In these four days, the wagon
How many times it was filled, how many times it was emptied?
How many passengers were left behind?
We have smiled and looked after the ones who left and the ones who left their places to the new comers…" we have reasoned about the functions, word problems, and even created little poetry.

Blaise Pascal (1623-1662) thought us limit…"There are three points where the knowledge comes face to face; one is the premature, pure and natural illiteracy, the other is the border line to which only big thinkers can reach when they walk from the pathways of the scientific knowledge, and it is where they realize that they know nothing."

3.1.RESULTS

As an artifact of the course, the following constructs are built by juxtaposition. Art literacy level of both me and the students increased immensely. Students realized that creation is a process that one needs to elaborate on and think. This made them to prepare themselves for working like a mathematician. They brought pieces of their mathematical art work almost every week (as a course grading procedure, they were graded "+" for their small art works, but after a while their bonuses exceeded almost the number of weeks in a semester. They studied mathematics more than they were accustomed to. They became to appreciate more artistic and mathematically enriched pieces of art by the weeks passing. Students were more creative during the course without a question. Some of the worksheets required collaborative and cooperative studying. Their group skills jumped to a higher level. Identification and reasoning with patterns is a crucial issue in everyday life. The patterns they saw were mathematical art patterns of ISAMA and BRIDGES (two mathematical art conferences which stress originality and high level mathematics behind). Their confrontation with these made them critical of their own creations. Students found themselves to teach what they learn to their siblings, brothers, sisters, students, friends, families. And we know that teaching is half way of learning. They were cognitively guided by their level of interest and cognitive immersion into the mathematical content and this also acted for them as a therapy.

3.2.CONCLUSION

Both art and mathematics are thought to be for some elite groups like for the most intelligent or for the wealthiest. I think this course has showed to me and to students that connections revisited may help us create some new ways for underrepresented students to go forward both in mathematics and in art.

It is important to mention that this course was not alone. Throughout the years, there have been at least two other universities in Turkey who took this type of courses into their academic programs. It is believed that in the following years, more research and observations from these other courses could be seen in the journals and conferences so that the number and the variety of these types of math and art connection courses flourish.

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THE ROLE OF THE "KNOWLEDGE SKETCH STRATEGY" TOWARDS THE UNDERSTANDING OF METACOGNITIVE KNOWLEDGE

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ABSTRACT
This study aims to apply "Knowledge Sketch Strategy (KSS)" in the teaching of physics in physics master program graduate student of Makassar State University. The expected result is through the implementation of teaching strategies that the students have the ability to understand metacognitive knowledge. The research design was "post-test only control group design". For this purpose, there are two research groups, ie the experimental group that is given knowledge sketch strategy teaching, and the control group that is given teaching strategy in the form of "Known-Asked Strategy (KAS)". The data analisys shows that the experimental group has the average score of 8.41 and the control group is 4.33. This result indicates that the KSS is better used as the physics teaching strategy than KAS to understanding of metacognitive knowledge in learning physics.
Keywords: metacognitve knowledge, teaching strategy, and learning physics.

INTRODUCTION

In the start of 2015/2016 academic year, the new students of physics education program were given essay test of parabolic motion unit at the first lecture. This test aims to determine the ability to understand the concepts of physics that they had learned during school. The result is from 26 students tested, none of the students can answer correctly75.0% from maximum score of 10.This result indicates that the students' understanding of the concept of parabolic motion is very low. This also means that their metacognitive knowledge is lacking. Kim, B., Park, .H,.& Baek, Y., (2009) states that metacognitive knowledge is important for learners in understanding the material and improving the level of higher-order thinking

It is suspected that it happened because in the middle school they were rarely taught metacognitive knowledge. According to Widodo (2008) that most teachers only teach the simple factual, conceptual, and procedural knowledge but they seldom teach the metacognitive knowledge. One reason is that even physics teachers lack metacognitive knowledge. This has been proven through the provision of parabolic motion unit test to 32 physics teachers from the alumni of Makassar State University who are joining the matriculation program of physics education magister in Makassar State University academic year of 2015/2016. The results are 8 teachers (21.9%) have above 75% correct answers, the rest, 24 teachers (78.1%) have below 75% correct answers (Abdullah, 2014) .The inability of teachers to answer the test also indicates that teachers' knowledge in metacognitive is still low.

Based on these facts, it can be assumed that the inability of students to answer about parabolic motion because when they were studying in high school, they were rarely taught metacognitive knowledge. Why is that? Because based on the above facts, teachers also lack the mastery of metacognitive knowledge, especially related to the teaching of physics. Thus, researchers assume that physics teachers have been taught or trained about the problems of learning models, teaching theories, how to plan lessons, how to manage classes, how to organize worksheets, how to make evaluations, but they are seldom trained on their student about strategy for solving higher-order physics problems. Though one indication of student success is determined by the ability to solve physics problems.

Researchers found that the pattern of solving physics problems that physics teachers had been using was the "known-asked strategy (KAS)". According to Abdullah.H, Bunda.P, D. Malago. J & Thalib. S.B, (2013), this strategy can be applied to questions of the use of formulas, but it is very difficult to apply if they have demanded the translation of equations. The researcher will write two physics problems that have been used as a tool to know the understanding of metacognitive knowledge.

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Table-1: Two different physics problems of difficulty level

Problem-1	Problem-2
A motorcyclist, suppose when t=0 speed is 10m/s (36km/h), after moving for 10s to 20m/s (72km/h). What is the distance traveled by the rider during 10s?	A tank was storming into a military base. The tank is moving at a speed of 20m/s (72km/h). A soldier in a 35m high-alert tower got ready to open fire. The cannon is set at an angle of 37^o horizontally. If the initial velocity of the cannonball is 50m/s. Determine at what distance the tank is from the foot of the tower is fired so that the tank is hit by the cannonball?

It is seen in Table-1 that both problems have different characteristics and difficulties. For problem-1, almost all students can solve it by using KAS, but at the time of completing problem-2, all students cannot solve the problem by using KAS. Why did it happen? Because KAS is very difficult in detecting latent variables or principles in the problem. KAS is only able to identify the clear variables written in the problem as in the above problem-1. While in problem-2 there are latent variables or principles that are not clearly written in the matter of the issue of the time the cannonball moving toward the target point is equal to the time the tank is moving toward the target. This variable is very difficult to detect by KAS.

Based on the above problems, the researcher has implemented a problem solving strategy called "Knowledge Sketch Strategy (KSS)". This strategy has been used to Physics Education Studies students who are programming basic physics courses (matriculation program). The purpose of this KSS implementation is in addition to training the master of education physics program (prospective teachers and teachers) on how to solve physics problems with KSS, is also to know its role to the formation of "metacognitive knowledge" of students. Therefore, the question in this study is "*how is the score of understanding of metacognitive knowledge of university physics education master program student of Makassar State University, taught by using KAS and taught by KSS?*"

THEORITICAL FRAMEWORK

In relation to metacognition, Schneider, W., (2008) states one of the main aspects of metacognition is metacognitive knowledge. Duque,D.F., Baird,J.A., & Posner,M.I,. (2000) states metacognitive knowledge is knowledge of cognitive ability, cognitive strategies, and cognitive tasks. Whereas, Santrock, J.W (2004) states that, metacognitive knowledge involves monitoring and reflecting on one's mind, including factual knowledge, such as knowledge of tasks, goals, or self, and strategic knowledge (such as how and when to use specific procedures to solve problems). Arends (2007) mentions that metacognitive knowledge is knowledge of cognition and when to use conceptual and procedural knowledge to solve problems.

Based on the above explanation, metacognitive knowledge is the knowledge of the cognitive processes used to solve problems based on the factual, conceptual and procedural knowledge they possess. Thus, any problem will be difficult to solve if one has no factual, conceptual and procedural knowledge related to the problem. On the other hand, although a student possesses these three pieces of knowledge but rarely used them to solve complex problems, his/her knowledge is difficult to develop into metacognitive knowledge.

Nowadays, the learning paradigm no longer leads to mastery of "text-book" material, but how through the learning material, the learners have the skills of thinking and insight or have metacognition strategy in solving the problem. For this, the learning of metacognitive knowledge becomes very important. Santrock, J.W, (2004) states that metacognitive knowledge is taught to students to help solve the problems (mathematics as well as physics problems).

Huffaker.D.A, & Calvert, S., (2003), stated that the latest science learning encouraged to design an interesting curriculum that can apply the real world, the practical world that occurs in the community, and the most important is to provide opportunities for learners to learn both in class and out of class. This view implies the importance of teaching metacognitive knowledge for the teaching of science (physics). The same thing is expressed by Vanlehn, K., Burleson, W., Echeagaray, M.E & Christopherson, R. (2011), that teaching using metacognitive strategies is well suited to be developed in physics learning, especially in relation to problem-solving in higher-order physics problems).

In addition, the impact of metacognitive learning is immense for learners as Oxford points out. Torkamani, H.T. 2010.,) state that metacognitive strategies will help learners to organize: (1) themselves as learners, (2) the learning process, and (3) specific learning tasks. The same thing is expressed Okoro.C.O. & Chukwudi, E.K.

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(2011) that in teaching, metacognitive knowledge strategies can help students learn to think and draw conclusions from the concepts they learn. Therefore, to realize it in the context of the physics learning, it requires a separate strategy in solving physics problems. The strategy to be developed in the research is "Knowledge Sketch Strategy". This strategy has been developed by Abdullah (2014) as a strategy in basic physics learning.

What is a Knowledge Sketch Strategy? According to Abdullah (2014) that knowledge sketch strategy is a way of solving physics problems using images as sketches of knowledge in translating the problem's language. Specifically, this strategy consists of three stages: (1) **Sketches of Knowledge**, the ability to manipulate problem statements into the form of design drawings that make it easy to identify the associated magnitudes. The mechanism is to sketch the image of the object in the problem both for the initial conditions and as well as the later end condition of the sketch is to determine the magnitude of the accompanying drawing sketch, for example for the vector quantity of the arrow in accordance with its direction. (2) **Formulating** is a process of formulation based on drawing sketches with reference to basic concepts, principles and formulations. (3) **Executing** uses mathematical principles to solve problems based on the formulation described

By scanning the steps in applied the Knowledge Sketch Strategy, then the real phase of the picture also reflects the process of reasoning exercise. That is, if this strategy is taught to learners consistently, then in addition to the understanding of metacognitive knowledge can be achieved, the learners' ability of reasoning will also be honed properly. Scientific reasoning is done inductively and deductively. Inductive reasoning means developing the general rules, principles, and concepts of observation and knowledge of specific examples. Deductive reasoning is to apply the rule of inference to the formal model to decide whether specific examples are in accordance with logic.

METHOD

This research is an quasi exeriment that implements physics teaching strategy called KSS. To see the role of KSS in understanding metacognitive knowledge in physics teaching, another strategy used as comparison is KAS. Therefore, the researcher has assigned as many as 35 students of Physics Education Magister Program of Makassar State University in basic matriculation physics program. Then from 35 students, they are grouped into two classes, 17 students as experimental class and 18 students as control class. Experiment class is taught with KSS and control class with KAS. After four teaching classes, both classes were given a metacognitive knowledge comprehension test.

The limitation of understanding metacognitive knowledge in this research is the ability to organize concepts, principles, laws, and formulations in solving higher-order physics problems. Therefore, based on this indicator, the test used to measure the understanding of metacognitive knowledge is the description test. The number of tests is one problem with the completion time of 45 minutes. While the maximum possible score is 10 and the minimum score is 0.

The process of scoring the results of metacognitive knowledge understanding is done in two ways, which are determining the average score and determining the percentage of the number of students who scored above 80% correct. The result of processing and discussion are described in the following sections.

RESULTS AND DISCUSSION

The metacognitive knowledge comprehension scores of experimental class and control class students were processed to determine the average score, the standard deviation, and the percentage of students who scored 80% and above. The processing results are shown in table-2 below.

Table-2: Results of data analysis

Aspects	Experimental Class	Control class
Sample (n)	17	18
Average score ($\bar{x}$)	8.41	4.33
standard deviation(Sd)	1.73	2.49
the percentage of students who scored 80% and above	76.47	16.67

Seen from table-2 above, it turns out the average score obtained from the experimental class is greater than the average score of the control class. Similarly, from the percentage of students who scored above 80%, the experimental class is superior to the control class. Thus it can be argued that the actual strategy of teaching physics by using KSS is much more significant than the KAS in terms of understanding of metacognitive

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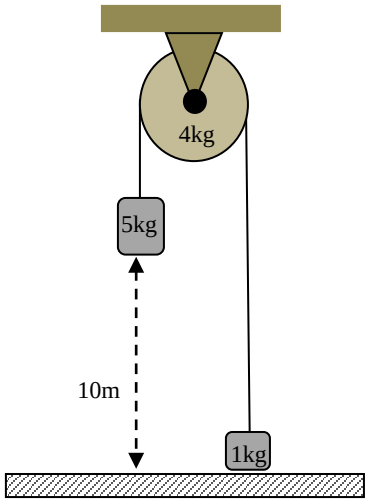
knowledge. Why did it happen? To answer this question the researcher will discuss the process of solving the problem through the following KAS and KSS.

Figure 1. Fixed pulleys and two loads

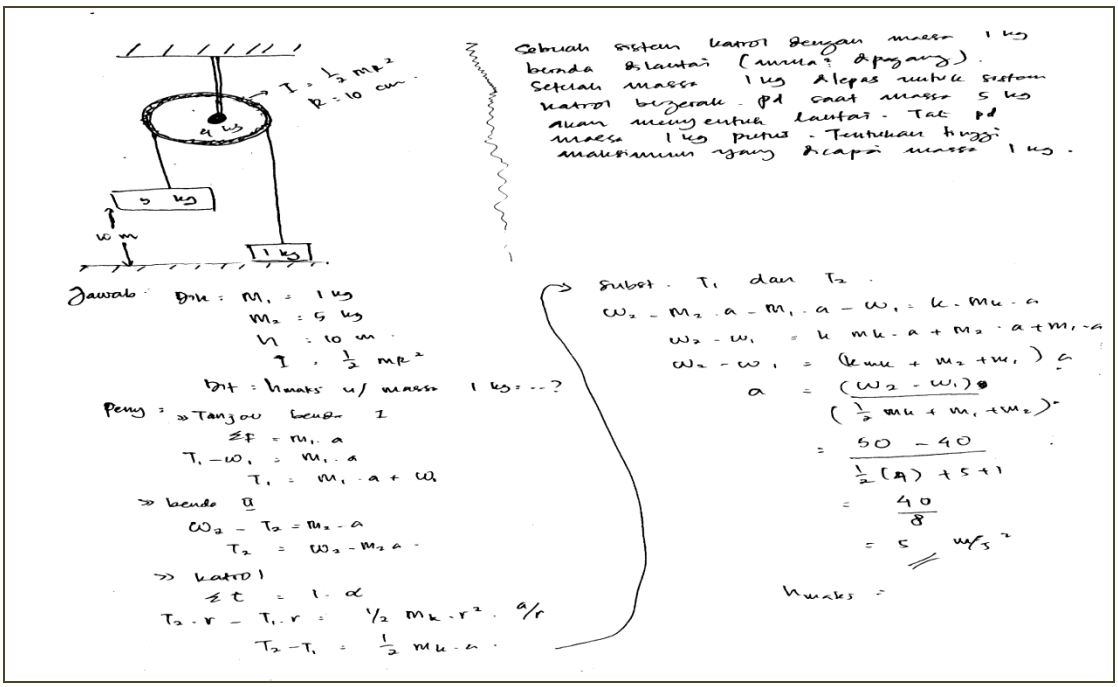


Problem:
A pulley system is shown in the figure 1on the side. Mass m_1 is 1 kg on the floor (held). And mass of m_2 is 5 kg hung as high as 10 m from the floor. The pulley mass is 4 kg. When m_1 is removed from the handle and m_2 moves downward to the floor. After m_2 arrives on the floor, the straps on m_1 break.Determine the maximum height reached by m_1. Asume air friction and mass rope ignored (using g=10 m/s2).

Before the researchers review the problem-solving process by means of KAS and KSS, the researcher cites Abdullah's statement (2014), that the problem-solving strategy generally requires three stages: (1) variable identification, (2) formulation, and (3) mathematical operations (the execution). The difference between KAS and KSS in solving the problem is in the variable identification stage. If KAS uses the "known" way, then KSS uses "picture sketch". For more details can be seen example of the problem in Figure-1, the problem is used to measure the understanding of metacognitive knowledge of students.

In solving the above metacognitive knowledge problem, according to KAS and KSS that have been selected from the result of problem-solving by the control class students and experimental class are as follows.

Figure 2. solution problem by way of KAS



It can be seen in figure 2, that the solving of KAS problem especially in the stage of identification of variable by way of "known", it gives less information to variable and principle contained in the problem. In this way, only variables listed in quantity can be identified. Whereas in the matter, there are variables and principles contained

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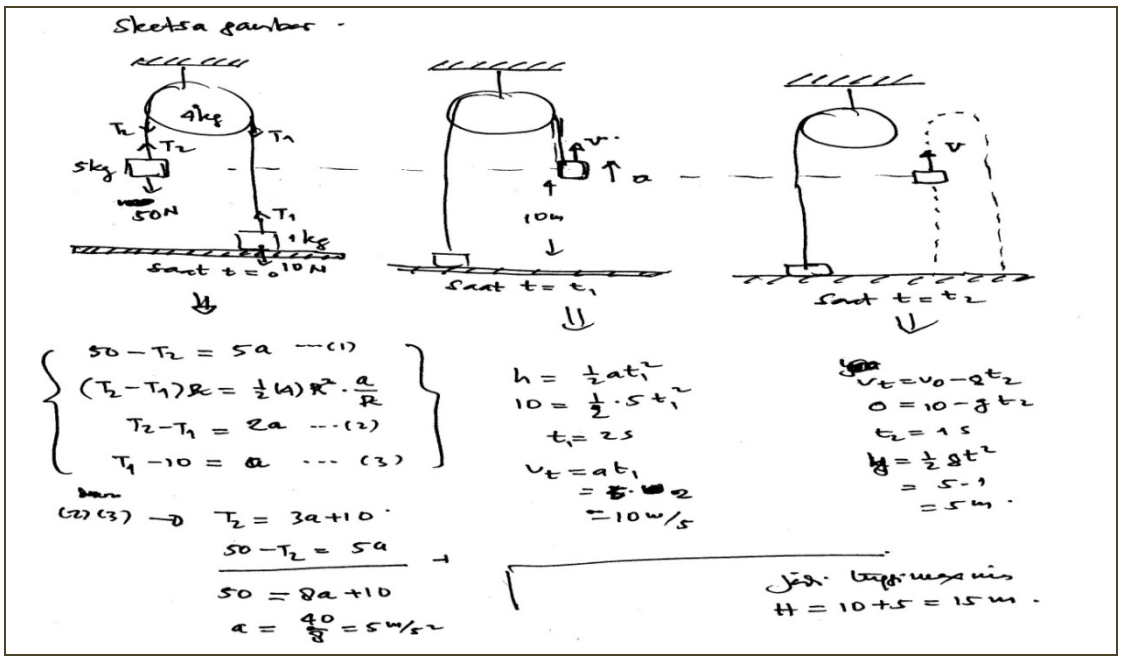
in the problem that are not well identified. like in system acceleration variables, the speed of m1 when it reaches a height of 10m, and the time to reach the maximum height. Similarly, Newton's second law principle, force moment, vertical motion and free fall motion. As a result, by the way of "known" the student will have difficulty applying the formulation and describe the equation. Here lies the weakness of the completion of physics problems by means of KASs, especially in solving higher-order problems (having metacognitive knowledge).

Figure 3. solution problem by way of KSS



On the other hand if done by using KSS, it will be clearly illustrated the step of the system movement from the moment of t=0, when t=$t_1$and at t=t_2, as shown in the completion of the physics problem in figure-3. Look for the displacement image sketch of m1 when t=0 to t=t_1, it is easier to use and describe both Newton's law formulation and force moment. So for m1 when it is at a height of 10m, then its speed can be determined. Similarly in the shift of m1 when t=$t_1$to t=$t_2$where the string breaks and m1 moves upward with velocity v to reach the maximum height.

In addition, in terms of aspects of learning, it can be seen the comparison of physics teaching using KAS and KSS. If using KAS, students are actually trained only in the aspect of ability to remember and understand. That is, considering the use of concepts and formulations, but very less developed in other aspects of higher-ability thinking. While the teaching of physics by using KSS, students will be trained to have special abilities such as: (1) **imagination** to change verbal language into sketch form of drawing, (2) **to analyze** the ability to sort out the problem statement into knowledge segments, and (3) **to describe** the equations based on the sketches of the knowledge they draw.

In general, the explanation of the teaching of physics with KAS and KSS on its role in physics learning can be seen in the following table-2.

Table-2

Stage in Solving the Problem	Aspects In Physics Teaching	
	KAS	KSS
Identification	Know and remember variables, concepts, and formulations	Imagine, analyze and design sketches of knowledge in the form of drawings
Formulating	Using Formulation	Use formulations and describe equations based on principles
Executing	Mathematical operations	Mathematical operations

It can be seen from table 2 above that the main difference in problem-solving strategy as a teaching strategy between KAS and KSS lies in the identification stage. In KAS, students are only trained to identify by knowing (remembering) variables, concepts, and formulations. While in KSS, students are trained to translate that matter into the form of sketch drawing for each particular stage. From the process of translating, the student is actually

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trained in the ability to imagine, analyze, and design drawing sketch. This exercise of ability is the necessary basis for training higher-order thinking skills. It just can not be denied that to plan the teaching of physics by using KSS, a teacher must also have high-order thinking skills, such as preparing questions that require high-order thinking skills and have the KSS ability.

CONCLUSION

One of the most effective ways to solve higher-order physics problems is by KSS. This strategy has advantages compared to KAS, which can identify written variables, hidden variables and basic principles or relationships between events when t=0 and t=t. Viewed from the aspect of learning, the most important goal of teaching by means of KSS is to train the imaginative side by translating the language of the problem (abstract) into a sketch of the image (real). This imaginary ability is very important in physics teaching, because the study of physics is abstract.

RECOMMENDATION

It is fully realized that the study of KSS is still very limited only to the aspects of metacognitive knowledge. Researchers recommend that this KSS can also be studied from the aspect of its role to other thinking skills.

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UNDERSTANDING ACADEMIC UNDERACHIEVEMENT OF THE MINORITY ETHNIC GROUPS IN NEW ZEALAND: THE ISSUES OF CLASS AND CULTURE IN EDUCATION

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ABSTRACT
The academic success of the minority ethnic groups in New Zealand who have been historically disadvantaged by the schooling system is a major education initiative of the New Zealand government. These underachieving groups of learners are currently referred to as 'priority learners' in New Zealand. This paper portrays the prominent debate on academic underachievement of minority students in education. The issues of class and culture are discussed in depth through the theoretical lenses of Marx, Bourdieu and Gramsci with reference to Maori and Pasifika students. We support the view that inequality in education is caused by class locations not cultural identifications. The academic success of these students is dependent upon educators' need to challenge their own deficit thinking on minority students' underachievement.
Keywords: priority learners, inequality, class theory, hegemony, cultural capital, bourgeoisie, proletariats

INTRODUCTION

Schools legitimate inequality through the ostensibly meritocratic manner by which they reward and promote students and allocate them distinct positions in the occupational hierarchy. They create and reinforce patterns of social class, racial and sexual identification among students which allows them to relate 'properly' to their eventual standing in the hierarchy of authority and status in the production process. Schools foster types of personal development compatible with the relationship of dominance and subordination in the economic sphere (Bowles & Gintis, 1976).

Modern education system is recognised by theorists in the Marxist tradition as providing for bourgeoisie ideologies and reproducing inequalities in society through its dominant upper middle class knowledge and practices in education. The education system based on the principles of universal and equal opportunity education for all turns to apply unequal treatment to groups of people, mostly coming from poor cultural and social class backgrounds. The purpose of this paper is to investigate the role of education in strengthening cultural gaps and class inequalities in society, specifically in New Zealand. This paper intends to investigate, whether inequality in education is caused by class locations or through cultural identifications. It is fundamental to explain inequality in education, since it leads to social differentiation in the society in terms of resources and opportunities.

For the purpose of this paper we will use two contrasting arguments on underachievement of minority students and/or inequality in education, which are known as class theory and culture theory. The use of culture theory will be justified through the concept of cultural identification as causing inequality in educational achievement of Maori and Pasifika learners. It shows location in cultural understandings and claims that inequality comes through how power is distributed (Rata, 2001). It will look back on the role of colonisation to argue on how Maori cultural interests were suppressed in education and alienated in educational practices. It will also look at cultural hegemony explanations of Gramsci used by cultural theorists in their justification on culture.

Alternatively, the class theory will be explained through the mechanisms of capitalism (super-structure ideas) and economic forces based on the explanations of Karl Marx (1848). It will look at the socio-economic class locations in the society and how it causes class difference and exploitation. Class dominance will be explained

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using Bourdieu's (1977) cultural capital and class inequality analysis. The class theory will be reflective of the ideas of Nash (2000); Marie, Fergusson, & Doden (2008); OpenShaw (2007); Rata (2001).

This paper uses the examples of Maori and Pasifika educational outcomes to explain the issues of inequality in education. This paper takes a stand that inequality in education is caused by class locations in society and their socio-economic positions that serves as working class ideologies and is often reproduced by education, broadening further inequality. Therefore, teachers/educationalists need to challenge their self-perceptions and beliefs around success for minority learners in New Zealand.

We view the use of the terminology "priority learners" which was first introduced by the Education Review Office in 2012 in their report on achievement for Maori and Pasifika students in New Zealand schools, problematic.

THEORETICAL FRAMEWORK

Causes of Inequality in Education

Discourse on the concept of inequality can be traced back to Aristotle with a strong influence from nineteenth century Liberalism and twentieth century Socialism. Ghosh and Talbani (1992) explained the notion of inequality in modern society as influenced by the conceptions of Liberalism and Socialism and is reflected in the principles of equality of status and equality of opportunity. "Inequality in society arises from a fundamental root- the inequality of power" (Hicks, 1960). Writers in the Marxist tradition argued that inequalities in education are caused by education's role in the capitalist economy, where education behaves like any form of capital, those who own the capital, exploit those without it. In education, capital is a person's qualifications which is used to increase one's 'cultural capital' and 'social capital'.

Qualification determines a person's success or failure in the society and becomes a means of ensuring elite status and privileges over other members of the society. Therefore Rata (2008) pointed out that education actually creates inequalities by distributing qualifications that are valued differently in society and positioning individuals into different social classes, reproduces inequalities across generations.

Individuals are naturally different in terms of their intelligence and talents due to biological and genetic forces. Rata (2008) explained this approach by pointing out that if differences in individuals have a natural cause then not recognising these differences will lead towards treating children unequally. Another approach according to Rata (2008, p. 39) explained individual abilities and talents through social causes, where "unequal social circumstances mean that even equal opportunities are unable to compensate for initial inequality".

In contrast to the liberal and socialist approach is Johan Herder's culturalism approach, which explained that status hierarchies and rule by birth- ascribed elites, as the natural way to distribute authority. He explained that individuals are constructed within the social relations of their culture and therefore must be identified as the member of the ethnic group, which has a strong connection with their history, tradition; culture, language and lifestyle as a basic need (Burke, 2000). Culturalism has given rise to 'identity politics' and 'biculturalism' in New Zealand education through the establishment of Kura Kaupapa Maori schools.

Inequality is also explained by some historians as a consequence of colonisation practices and policies, which were embedded in the education system at the time it was established and subsequent developments including the educational reforms have reproduced these inequalities. Therefore inequality in education has to be understood in terms of the relationship between education and wider social, cultural, political and economic forces in the society.

At a time of rapid social, political and cultural change such as the present, the history of education has the key role in re-assessing aspects of education that have tended to be taken for granted. (Coxon, Jenkins, Marshall, & Massey, 1994).Hence we find it vital to explain inequality in education through class versus culture theory.

Class Theory

Capitalism and class

The basic idea of capitalism was developed by Marx (1848-1883). Marx's interest in the class theory laid specifically in the social class, the industrial working class and viewed capitalism as inevitable for the development of Socialism. Marx's class theory rested on the premise that "the history of all hitherto existing society is the history of class struggle" (Marx & Engels, 1962, p.37). Society according to Marx comprised of a moving balance of 'antithetical forces' that generated social change by their tension and struggle. Society was seen struggling for dominance amongst competing social groups (classes, gender, races and religion) through

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the power, authority and coercion of dominant groups. The most powerful member of the dominant group creates the rules for success and opportunity in society, often denying subordinate groups such success and opportunities. This ensured a continued monopoly of power, privilege and authority of the dominant class, whereby "The ruling ideas of each epoch are those of the ruling class" (Marx & Engels, 1962, p.38).

Marx suggested the main reason for social class inequality laid in the private ownership of the 'means of production'. These were the key bourgeoisie resources like land, property, factories and business which were necessary to produce society's goods. The individual social class was defined according to the ownership of the means of production. Due to necessity, people engaged in the acts of production using the 'forces of production' to engage in the production process. This showed that the society exists through its 'material infrastructure' or 'forces of production' and through highly organised 'wage labour'.

This engagement built economic relationship between the two classes of people- the bourgeoisie or capitalist and the proletariats or working class. When the two classes cooperated to produce a good, Marx called these as 'relations of production'. The 'forces of production' and 'relations of production' made the 'mode of production'. Marx viewed the 'mode of production' as the 'economic base' for the society, that generated the 'superstructure' of ideas such as religion, education, art and political systems, hence it formed a consciousness in men determined by society existence or position held in the society.

Cheal (2005) described the relationship between capital and labour as a power relationship in which the bourgeoisie exercises power over the proletariats. The need for 'capital accumulation' made the bourgeoisie more competitive, hence exploiting the workers. This created a 'surplus value' or profit from workers. Since the worker is exploited he becomes alienated from the production and process of his labour. Marx pointed out that as more workers become 'dispossessed' of the means of production, the proletariats would grow in size and will overthrow the bourgeoisie in revolution, thereby creating a classless society (Cheal, 2005).

Marxism also explained the development of 'ideological hegemony' which developed from the economic base and structure of the society, in favour of the dominant ruling class. According to Marx the class of 'dominant material force' in the society turns to be the 'dominant intellectual force', since they owned the production and distribution ideas and used ideologies to preserve their own interests by setting up levels (status) to administer society, reflecting the bourgeoisie identity (Cheal, 2005).

Materialistic Domination in Education

According to Marx and Engels (1848) the ideologies of the ruling class was manifested through education. The education system was seen as a part of superstructure that was a reflection of the material economic base of the society that served to reproduce inequality. It simply meant that the institution of the society like education was reflection of the world created by human activity and that ideas arose from and reflected the material conditions and circumstances in which they were generated (Burke, 2000).

Hence education was recognised as one of the key bourgeoisie institutions that exercised hegemony in practice.

Bourdieu also explained materialism through the theory of reproduction, where dominant classes maintained their position through the control of material and symbolic resources. They are able to manipulate those in an educational system that gained legitimation from its apparent commitment to the principles of democratic equality, while acting all the time as a particular effective conservative force (Bourdieu, 1977). According to Bourdieu, schools actively excludes those it deems to possess an 'inferior' habitus, since schools work on the habitus of the dominant class, those who lack this cultural capital are systematically excluded. This can be explained by Nash's (2000) example of Pasifika students who fail to 'internalise' the levels of achievement and maintain it, this positions aspirations as an 'unattainable dream' for minority learners.

According to Bourdieu's 'statistical mode of production', schools placed educational credentials as necessary requirements of entry to professional and commercial occupations. Nash (2000) explained reproduction through the transmission of 'symbolic capital' mediated by the 'objective' mechanism of the school that operated with its own scholastic logic, ensured only the general 'statistical' success of the dominant class.

Education and Cultural Reproduction

Theories of education and cultural reproduction claim to show how education (through its language, values, processes and knowledge) ensured the reproduction of cultural and economic inequalities. Bourdieu argued that

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schools transmit certain forms of culture and thus reproduce not only that culture but also its social class structure. Gibson (1986) added that at school children learn that only certain forms of culture is important. The middle class pupils already have access to these 'cultural codes' while the working class do not.

Schools thus favour those already favoured and hence cultural inequality is reproduced. According to Bourdieu although schools claim to be fair and neutral transmitters of 'culture' they effectively maintain inequality, whilst claiming to provide equal opportunity. Bourdieu uses symbolic violence, cultural capital and habitus in explaining the relationship between education, culture and domination.

Bourdieu (1977) described 'symbolic violence' as a subtle process whereby the subordinate working class pupils come to take as 'natural' or 'common sense' ideas and practices that are actually against their own best interest. Symbolic power is wielded by schools to ensure that inequalities are seen as necessary and inevitable rather than man-made and changeable (p.55). Schools' therefore legitimise and reinforce disadvantage. Working class children find their home culture devalued and disconfirmed, but accept that rejection as legitimate (Gibson, 1986).

Bourdieu's cultural capital and habitus referred to the forms of culture valued or devalued in education in relation to the social class of the particular culture. Bourdieu (1977) explained cultural capital as 'language, meaning, thoughts and behaviour styles, values and dispositions' that identify a child to a social group, therefore habitus is an embodiment of the cultural capital 'internalised' by the child such as speech, attitudes, body language and aspirations.

METHOD

We used secondary data from Statistics New Zealand to support our argument on the underachievement of minority ethnic groups in New Zealand. The data used is 2006 and 2013 New Zealand census data which was gathered through longitudinal surveys.

RESULTS

Figure 1: Qualification Attainment by Maori in 2006 & 2013

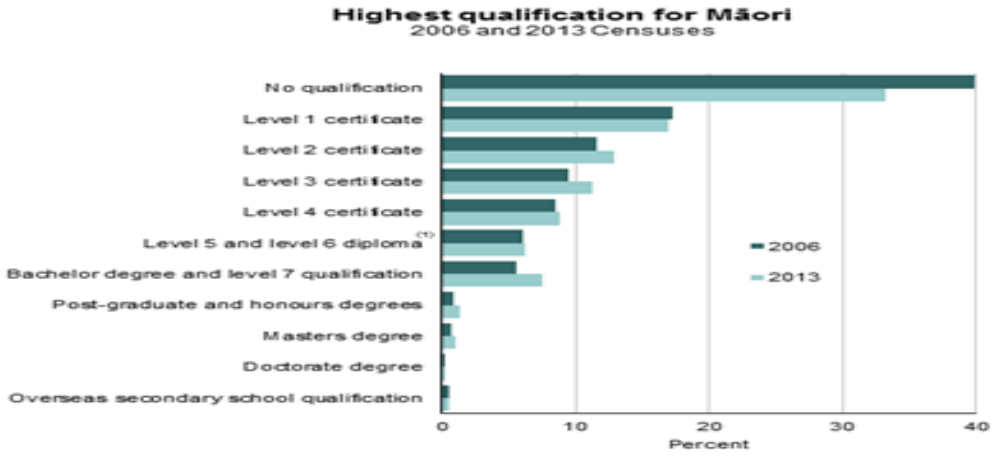

Figure 1 shows the New Zealand highest qualification attainment percentage by Maori in 2006 and 2013. It should be noted that most Maori people had qualifications at level 4 and below in both consensus years. Which strongly indicates an unsuccessful secondary schooling education experience.

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Figure 2: Qualification Attainment by Pasifika in 2006 & 2013

1. These categories have been combined due to data quality concerns.

Source: Statistics New Zealand

Figure 2 shows highest qualification attainment by Pacific people in New Zealand in 2006 and 2013. It should be noted that less than 15 % of Pacific people had a qualification at level 5 and over, noting that no Pacific student had a doctorate degree in both 2006 and 2013 census records by Statistics New Zealand.

Figure 3: Qualification Gained by Dominant Ethnic Groups in New Zealand

1. People reporting more than one ethnic group were counted in each stated category.

Source: Statistics New Zealand

Figure 3 shows a comparison between qualifications gained by the dominant ethnic group categories in New Zealand. It is obvious that the qualification attainment percentage for Maori and Pacific peoples has increased slightly from 2006, however when compared with other ethnic groups such as European and Asian it is relatively low.

Based on the data shown from the three figures, it could be postulated that Maori and Pacific peoples form the largest youthful working population in New Zealand who have a qualification which is at level 4 or below. This strongly supports our argument on the significance of class distribution in society and the role of power structures in place which favours the ruling class ideologies and creates systematic exclusions of marginal classes.

DISCUSSION

The fundamental explanations on class by Marx and Bourdieu provided the basis of the argument on class theory. Therefore we find it useful to emphasise that class theoretical views strongly support inequality in education. Educational outcomes between Maori, Pasifika and other New Zealanders should be explained by considering the role of socio-economic disparities between them. According to Marie et al. (2008) it is the

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disadvantaged position of the Maori within the nation's labour market economy that has led to poor educational outcomes for Maori children in New Zealand.

These socio-economic disparities can be understood through linking economic status, resource capacity and educational performances of Maori children. According to Marie et al. (2008) Maori children are brought up in a single-parent environment, with limited income than non-Maori. Therefore Maori children are exposed to greater 'social adversity' and 'psychosocial risk' than other New Zealand children. This economic deprivation results from their economic positioning in the society that has a major influence on their educational achievement.

The placement of Maori at the bottom of the working class during the 19th century shows deprivation of Maori educational process during colonisation which led many Maori people being under qualified and without a formal qualification. As a result they became the poor working class people earning low wages, facing frequent financial hardships and having generally low standard of living. Furthermore, their children in early childhood are exposed to more socio-economic disadvantage. Marie et al. (2008) suggested that Maori children in early childhood are less likely to attend an early childhood centre due to economic constraints. Using Bourdieusian lens, it means that their 'cultural capital' necessary for progress at school are not developed when compared with Pakeha/European children coming from a good educational background with elite economic status, who possess basic 'cultural capital' required for schooling and they keep on expanding it through the process of schooling as on their side.

A greater number of non-Maori occupy elite positions in the job market through better qualifications and take control over all important resources acting like a Bourgeoisie. Whereas the Maori and Pasifika become dispossessed and dependent on low class jobs which does not require much training for their basic livelihood. Increased urbanisation has also added to the effects of marginalization of Maori people. Social divisions due to class locations between Maori and non-Maori broadened the educational 'gap' where education benefited those will cultural capital of the upper middle class and the economic system favoured those with economic capital. In both Marxism and Bourdieusian lenses, the working class Maori and Pasifika are the victims of educational underachievement in New Zealand.

Cultural Hegemony in Education

Cultural hegemony is associated with the works of Gramsci. According to Gramsci, cultural hegemony was a means of maintaining the capitalist state. Capitalism as Gramsci suggested maintained control, ideologically through a hegemonic culture in which the values of the bourgeoisie became the common sense values of all. Thus a 'consensus' culture developed in which people in the working class identified their own good with the good of the bourgeoisie and helped to maintain the 'status quo' rather than revolting.

The working class needed to develop a culture of their own, which would overthrow the 'notion' that bourgeoisie values represented 'natural' or 'normal' values of society and would attract the oppressed and intellectual classes to the cause of the proletariat. Gramsci saw cultural hegemony as fundamental to the attainment of power. The class that wished to dominate in the modern conditions had to move beyond its narrow 'economic corporate' interests to exert intellectual and moral leadership and to make alliances and compromises with a variety of forces. Gramsci called this as 'union of social forces' which produced and reproduced the hegemony of the dominant class through 'a nexus of institution', social relations and ideas.

Culturalist writers used Gramsci in developing the idea of hegemony as a strategy to control the state, whereby the interest of other groups and social forces are combined with its own interest to build a network of alliances with social minorities. The working class "must unite popular democratic struggles with its own conflict against capitalist class to strengthen a national popular collective will" (Bishop, 2003, p.29). The concept of cultural hegemony is evident in Maori cultural renaissance claims of biculturalism in New Zealand.

So far in our discussion we have looked at the foundations of inequality through the pioneering works of Marx, Bourdieu and Gramsci through critical class theory ideas, we will now explore culture theory to achieve the scope of this paper.

Culture theory

The culture approach provides an alternative explanation to inequality in education through ethnic difference or cultural identification model. Culturalism approach has been described as 'Maoritanga theory' and 'Kaupapa Maori theory' in New Zealand education since late 1970s. This theory regards Maori and Pakeha educational performances as different. According to Rata (2001) ethnicity is considered to be the main cause of division in

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society where a child's identity is understood first as a Maori identity. Therefore Maori underachievement is explained as a "systematic denigration and marginalization of Maori culture" (Rata, 2001, p. 152).

According to the culturalist perspective Maori people had been a victim of colonisation since the signing of the Treaty of Waitangi in 1840. Bishop (2003) explained that Maori have been marginalised through legislation, educational policies and initiatives. These policies and initiatives had affirmed Pakeha knowledge and practices to determent of Maori (Smith, 1997). Colonisation processes and the education system had rejected Maori language and culture because they were seen as obstacles for educational progress of Maori children (Pilkington, 2001). As a result "Colonising agendas remain embedded within present educational structures" (Smith, 1997, p. 186).

Historical disadvantages faced by Maori people are experienced in the lack of attainment of formal qualification. According to Smith (1997) historical educational policy reveals a lack of successful participation of Maori both in school and in society. Marie et al. (2008) explained that "the present day disparities are a result of an educational system that historically neglected to recognise cultural difficulties between Maori and non-Maori. Culture theory outlined that inequality results through how power is distributed, therefore Maori or Pasifika students' should be involved in a power sharing model, whereby their "voices are listened and given some power and self-determination" (Pilkington, 2001, p. 163). This power includes the rights for Maori to achieve the cultural aspirations they have for their children and to procure the appropriate resources so that education, as part of a cultural renaissance can improve their future life chances (Pilkington, 2001).

Bishop (2003) explained power and control as dominated from the colonising culture of New Zealand. The ideological foundations of assimilation and integration continue to be promoted by the new right politics of recent governments. Therefore Bishop suggested that the main-stream education system should address the needs of all its participants rather than just a dominant group. Culture approach for equality in Maori educational achievement therefore rested in reclaiming education through Kaupapa Maori schools in New Zealand.

The patterns of dominance, subordination and differences could be addressed through "pedagogy incorporating the reassertion of Maori cultural aspirations, preferences and practices known as Kaupapa Maori theory" (Bishop, 2003, p.4). The Kaupapa Maori theory is a collective resistance method by Maori leaders to revive their language and cultural values, therefore it is seen as a radical pedagogy which challenges and resists the hegemony of dominant culture. The Kaupapa Maori initiative is a reflection of Gramsci's notion of cultural hegemony where intellectual and moral forces combine with social forces to make an army against the dominant culture.

The discussion on culture theory mostly points out that cultural identification played a key role in educational inequality of Maori and non-Maori children, through 'distinct' pedagogical practices' and 'contrasting styles of cognition', which led Maori to be educated in a culturally inappropriate learning environment that failed to reinforce Maori values and beliefs in educational processes resulting in the loss of cultural esteem and devaluing Maori identity (Marie et al. 2008, p.184).

However, for the purpose of this paper, we do not feel confident in totally relying on culture theory to explain inequality in education through underachievement of Maori children because, culture theory explains Maori socio-political structures but it fails to explain the link between educational achievement and Maori access and participation in New Zealand's capitalist economic system (Marie et al. 2008, p. 184). One of the main attributes of Maori and Pasifika students' educational underachievement could be linked to bourgeoisie ideologies and values represented by educators in the mainstream education system through deficit thinking and polarized behavior on these students'.

Deficit Theorizing in Education

Openshaw (2007) suggested the theorizing of teachers' in New Zealand as one of the foci of Te-Kohahitanga Project. These theories and behaviour of teachers' has an adverse impact upon and make a difference to Maori student educational achievement. According to Shields, Bishop & Mazawi (2005) teachers' actions and behaviours and how they relate and interact with students' are governed by the discourses in which they position themselves and how they understand and position other people in the relationship (p.73). This engagement becomes vital in addressing the outcomes of the socio-economic marginalization of Maori people. It is evident that despite a parallel education system for Maori children, those Maori children in the mainstream English medium school perform poorly in terms of academic outcomes (Shields et al. 2005). This is identified as an effect of deficit theorizing. There are three main discourse identified by Shields et al. (2005). Firstly, the

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discourse of children and their homes, Teachers turn to blame children and their homes as problem for their underachievement. Secondly, the discourse of structure and systems was identified as causing a conflict between the values and standards of the school and the home, where Maori children find the knowledge taught at school as irrelevant to their needs. Thirdly, the discourse of the relationships, that teacher and student relationship had most influence on Maori students' learning and achievement. Good relationship enhances healthy learning environment.

To deal with the replication of hegemonic practices in education, educators' must learn to accommodate and renew their knowledge on the ways they have understood the educational achievement of minority groups in education. The 'normal' understanding of differences in society which is mostly through cultural identifications has to be erased in order to help equally open the doors of success for all ethnic groups in modern education system, which is neutral in practice and thus helps in creating classless society. It is crucial to re-iterate the consequences of teachers' own theorizing on the achievement potentials of different minority groups of students'. Which also means that teachers as agents of change should challenge their own deficit theories on minority students' educational achievement and should adopt strategies of change on teacher performance in classroom teaching.

To this end, we feel that the current terminology used by the New Zealand government when referring to Maori and Pasifika students as "priority learners" could be viewed problematic. We feel that such terminology regenerates and reinforces social and emotional stigmatization on students who identify themselves as Maori and Pasifika students and puts them into a national underachieving basket which could lead Maori and Pasifika students not identifying themselves as Maori or Pasifika due to labelling using a new terminology "priority learners". If we as educationalists and teachers are not careful with the use of this terminology it could overshadow achievement of those Maori and Pasifika learners who are doing extremely well in schooling/education. This could give rise to a new form of identity politics in New Zealand in the near future.

FINAL COMMENT

In this paper we have explored the issues of class and culture in relation to the underachievement of Maori and Pasifika students in New Zealand and we support the view point that inequality in education is caused by class locations. We found it important to draw on the argument of the marginalization of Maori and Pasifika children in mainstream education in New Zealand. The use of social theorists like Karl Marx and Bourdieu for class theory and Gramsci, Herder and Bishop for culture theory provided a theoretical base for this paper. Both argumentative lenses claim that the education system is based on the principles of bourgeoisie ideologies as a result it devalues the weaker culture, furthering inequality in society.

We found it imperative to discuss inequality in education because such inequality leads to social differentiation in the society amongst groups of people therefore it differentiates provisions in resources and opportunities. The class theory was identified as giving the broader explanations on the existence of inequality by taking into account socio-economic disparities that people face in daily living as more relevant explanations on underachievement of priority learners then cultural identifications based on ethnicity explanations. Deficit theorizing has also been identified as a significant problem for the increasing marginalization of Maori and Pasifika students' in terms of achievement in education in New Zealand. We urge educators to challenge their ways of thinking and working with the priority learners in New Zealand in terms of change in their perceptions and expectations, enabling effective support systems and also by reviewing the teaching techniques so that we are more inclusive and appreciative towards the needs of these learners within an inclusive but rather dynamic New Zealand classroom context.

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WORKING ENVIRONMENT, JOB CHARACTERISTICS, AND JOB MOTIVATION ON LECTURERS' JOB SATISFACTION: A CASE STUDY AT ONE PUBLIC UNIVERSITY

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ABSTRACT
This study generally aimed to find out the effect of working environment, job characteristics, and working motivation on lecturers' job satisfaction in Jambi University. Survey research method was used to investigate the relationship between variables and to test the hypothesis. Therefore, path analysis model was used to analyze the pattern of relationship between variables with the aim to determine the direct and indirect effect of a set of independent variables (exogenous) to the dependent variable (endogenous). A total of 857 lecturers of different faculties were getting involved as the population in this study, and in short as 273 lecturers were chosen as the samples by using proportionate stratified random sampling. The findings revealed that; there was a positive direct effect of working environment on job motivation, working environment on job satisfaction, job characteristics on job motivation, working environment on job satisfaction, and job motivation on job satisfaction. Limitations of the study, both theoretical and practical implications, and suggestion for further research were also conveyed in this study.
Keywords: working environment, job characteristics, job motivation, job satisfaction

INTRODUCTION

Job satisfaction is important thing in a series of management processes of an organization due to generate a morale that will ultimately lead in increasing productivity and performance. It involves the attitudes and feelings of a person who are closely related to two dimensions; work and the associated with self-employed (Anwar, 2000). Dimensions of work include wages and salaries received, opportunities of career development, relationships with other employees, job placement, occupation, organizational structure and quality of supervision. While the dimensions of associated with self-employee include age, health condition, ability, education and others. Furthermore, every human being experiences a challenge change, whether local, national, or global. The key to making changes is the human resources as the main supporters in an organization. Human resources are the employees of the organization. The way requires an empowerment of existing resources, especially human resources. With the empowerment of human resources in an organization then the employees can be more efficient and effective which will encourage the realization of autonomy and maturity of the employees themselves to face problems occurred when carrying out the task.

The problem of job satisfaction does not only occur in corporate organizations or government organizations alone, but also it can occur in the academic environment such as in Jambi University. Currently, Jambi University is one of the state universities in Jambi Province offering higher education from various scientific disciplines. Equipped with five decades of experience and supported by dedicated lecturers and staff, strong leadership with firm commitment and high community trust, Jambi University will always be committed and plays an important role in producing qualified graduates for the future of the nation. The long-term commitment of Jambi University is actively taking part in enhancing the nation's competitiveness through high quality of education.

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To be able to improve the competitiveness, it is required qualified human resources, teaching staff, or lecturers who competence in accordance with the required and able to apply teaching, research, and community services. In addition, there are many factors affecting both internal factors and external factors to be able to work optimally, one of those factors is based on the results of lecturer evaluation in even semester 2015/2016. Every end of the semester, there is a significant increase of responses or assessments provided by students on the lecturer's performance. The factor which is also visible from the attendance of the lecturer where the lecturer's presence is seen not so significant based on the attendance of lecturer every month. However, based on the results of preliminary observations, it was found that most lecturers of Jambi University feel dissatisfaction with their work. Certainly, this is not 100% representing the assessment of lecturers' job satisfaction.

As lecturers, they should be able to provide a healthy academic atmosphere, which can motivate students in teaching and learning process. This will certainly bring significant influence to Jambi University in managing the strategy, to maintain commitment and to inspire the spirit to remain and achieve the target in order to create an output that is in accordance with the ideals of Jambi University. Job satisfaction is a very important factor to get optimal work. When the lecturers feel satisfaction in working, they will do as much as possible with all the ability to complete the job task, thus it will increase the productivity of lecturers' work. For any organization, employees are vital resources and important investment; if employees are satisfied then they will be loyal to the organization (Alev, Gulem, Gonca, & Burca, 2009). Job satisfaction is an effective direction towards the desired results; some researchers defined job satisfaction as the employee's feeling toward their work (Kovacs & Goldston, 1991).

By adopting job satisfaction model from Pillai and Meindl (1998), it is assumed that job satisfaction is derived from work motivation, task / job characteristics, and working environment. The results of Hackman and Oldham's research (1975 cited by Prasetyo & Wahyuddin, 2003) indicate that the characteristics existing in the work have positive and significant relationship to job satisfaction (Loher, Noe, Moeller, & Fitzgerald, 1985) by using the meta-analysis procedure of 28 similar research results, concluded that statistically these two variables have the significant relationship. According to Robbins, Bergman, Stagg, and Coulter (2006), the quantity and direction of the relationship are influenced by moderator variables, for instance individual differences such gender, age, educational level, marital status, and situational factors; working environment, leadership, needs and so forth.

When job satisfaction and influenced factor can be identified through this study, then the results of this study will be useful as part of self-evaluation and can be set to maintain job satisfaction in working environment of Jambi University. There are consequences when lecturers are satisfied with their work, and there are consequences when they are dissatisfied with their work. According to Robbins and Judge (2003), a theoretical framework (out of the influence of devotion) is very useful in understanding the consequences of dissatisfaction such aspiration (voice), loyalty, and servitude. Besides, the researchers argue that one of the dangers of working discrepancy is a syndrome called deviant behavior in forms of the formation of defector groups, abuse of authority, theft in the workplace, inappropriate association, and inaction.

From the observable phenomenon, the central theme of this study is "job satisfaction" was explained by its forming variables; working motivation, task / job characteristics, and working environment. From this background, the author did research at Jambi University aimed to find out the effect of working environment, job characteristics, and working motivation on lecturers' job satisfaction in Jambi University. In other words, in this study the variables described were job satisfaction (Y), working motivation (X3), the characteristic of the assigned task (X2) and working environment (X1). The assumptions used to explain the effect of research variables included; (1) better working environment (X1), higher working motivation (X3), (2) more precise job characteristics (X2), higher working motivation (X3), and (3) higher working motivation (X2), higher the job satisfaction (Y). The main purpose of this study was to obtain empirical information on the influence between working environment, job characteristics and working motivation on lecturers' job satisfaction at Jambi University, while the specific purposes in this study were to observe; 1) direct effect of working environment (X1) on working Motivation (X3), 2) direct effect of working environment (X1) on bob satisfaction (X4), 3) direct effect of job characteristics (X2) on working motivation (X3), 4) direct effect of job characteristics (X2) on job satisfaction (Y), 5) direct effect of working motivation (X3) on job satisfaction (Y), 6) does working environment (X1) have an indirect effect on job satisfaction (X4) while have a direct effect on working motivation (X3)?, and 7) does job characteristic (X2) have an indirect effect on job satisfaction (X4) while have a direct effect on working motivation (X3)?

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RESEARCH METHODOLOGY

This research was carried out at Jambi University. The research started from February 2016 until November 2016. For the purpose of analysis, data collection was conducted through two phases. The first phase of data collection is to test the research instrument, then data were analyzed to determine the level of validity and reliability of the instrument. The second phase was the collection of research data in accordance with the needs in this study. The first phase was held in June 2016, while the second phase was in November 2016. This research used survey research method. This method is appropriate to describe the factual conditions, and it can also compare these conditions with predefined criteria. Additionally, it can also be used to investigate the relationship between variables and to test the hypothesis. Therefore, path analysis model was used to analyze the pattern of relationship between variables with the aim to determine the direct and indirect effect of a set of independent variables (exogenous) to the dependent variable (endogenous). The use of path analysis model is useful for; 1) describing the phenomenon being studied or the problem studied, (2) the prediction of the dependent variable value based on the independent variable value, (3) the determinant factor as the determination of independent variables having the dominant effect on the dependent variable, (4) the model testing uses theory of trimming. The variables referred in this study were job satisfaction (Y), working motivation (X3), working characteristics (X2), and working environment (X1). The effect among variables described the path relationship between variables X1, X2, and X3 to Y, presented on theoretical model of research as the following figure.

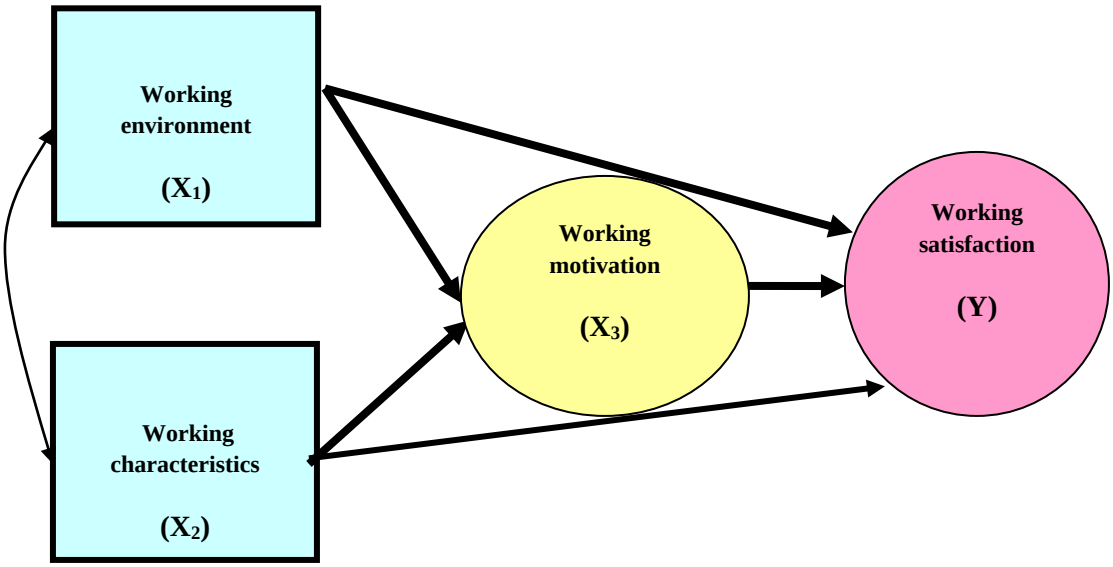

Figure1. Theoretical research model (adapted from Pillai & Meindl, 1998)

Figure 10 (theoretical research model) above showed that the path analysis model used was "correlated path model", which had 2 (two) sub-structures. The first sub-structure expressed the causal relationship of X1 and X2 to X3, and the second sub-structure expressed the causal relation from X3 to X4. In the first sub-structure, X1 and X2 were exogenous variables, and X3 was endogenous variables. In the second sub-structure, X3 was an exogenous variable and X4 was an endogenous variable

In this study, the target population and the affordable population served as the target of study were lecturers of Jambi University with a total of 857 lecturers. Because in this study using path analysis model, then the determination of the sample should meet the assumptions of the model used probability sampling to provide equal opportunities in each member of the population to be elected as a member of the sample. In addition, due to the heterogeneous population members, the sampling technique used proportionate stratified random sampling. Within the formula then obtained the sample quantities, as 273 lecturers were getting involved as the samples in this study. Nasir (2003) says that data collection technique is the necessary measuring tools in conducting a study. Data collected can be numbers, written information, oral information and various facts related to the research focus being studied. In relation to the understanding of data collection techniques and data forms to be collected, then in this study used two main techniques of data collection; documentation and questionnaire techniques.

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RESULTS AND DISCUSSION

Data of dependent variable as endogenous variable, consist of job satisfaction (Y) and working motivation (X3), and data of independent variable working environment (X1) and working characteristic (X2) as exogenous variables obtained by using questionnaire instrument from 857 respondents; 13 faculties at Jambi University. The number of questionnaires distributed amounted to 273 copies to the respondents, and those who returned as many as 273 respondents (100%). Based on the description of research data, the results of descriptive statistical calculations used SPSS version 21 programs were obtained the following;

Job satisfaction variable (y)

Job Satisfaction variable was measured through questionnaire consisted of 32 statements, using a scale of 1-4 where respondents chose the answer option in which score 1 is for strongly disagree, score 2 is for disagree, score 3 is for agree, and score 4 is for strongly agree. Based on the results of data analysis, the results obtained as follows:

Average Score

$$\overline{X}_4 = \frac{\sum X_4}{n} = \frac{857}{273} = 93{,}46$$

Standard Deviation and Variance

$$\text{Var}_4 = \sqrt{\frac{n\sum X_4^{\,2} - (\sum X_4)^2}{n(n-1)}} = \sqrt{\frac{84x(747093) - (7851)^2}{84x(83)}} = 160{,}3$$

$$SD_4 = 12{,}661$$

Frequency Distribution

The frequency distribution is based on the Sturges rule:
Range: R = 124 - 68 = 56. Number of classes: k = 1 + 3.3 log (84) = 7.35, rounded to = 8. Interval length class: p = 56 / 7.35 = 7.619, rounded to = 8. Lower limit of the interval class is 65.5. Based on these values, the frequency distribution is presented in the following table:

Table 1: Frequency distribution of group data on job satisfaction variable

Job satisfaction (Y2)		Frequency	Valid Percentage	Cumulative Percentage
Group Data	80,5 - 85,5	5	1,8	1,8
	85,5 - 90,5	16	5,9	7,7
	90,5 - 95,5	14	5,1	12,8
	95,5 - 100,5	37	13,6	26,4
	100,5 - 105,5	58	21,2	47,6
	105,5 - 110,5	71	26,0	73,6
	110,5 - 115,5	37	13,6	87,2
	115,5 - 120,5	24	8,8	96,0
	120,5 - 125,5	11	4,0	100,0
	Total	273	100,0	

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Table 2: Job Satisfaction (Y2)

Job satisfaction (Y2)		Frequency	Valid Percentage	Cumulative Percentage
Averange Group Data	Low	43	15,8	15,8
	Medium	181	66,3	82,1
	High	49	17,9	100,0
	Total	273	100,0	

Modus

$$M_0 = b + p\left(\frac{b_1}{b_1 + b_2}\right) = 81$$

Median

$$Me = b + p\left(\frac{0{,}5n - F}{f}\right) = 93$$

The graph of the histogram is shown in Figure 2 below:

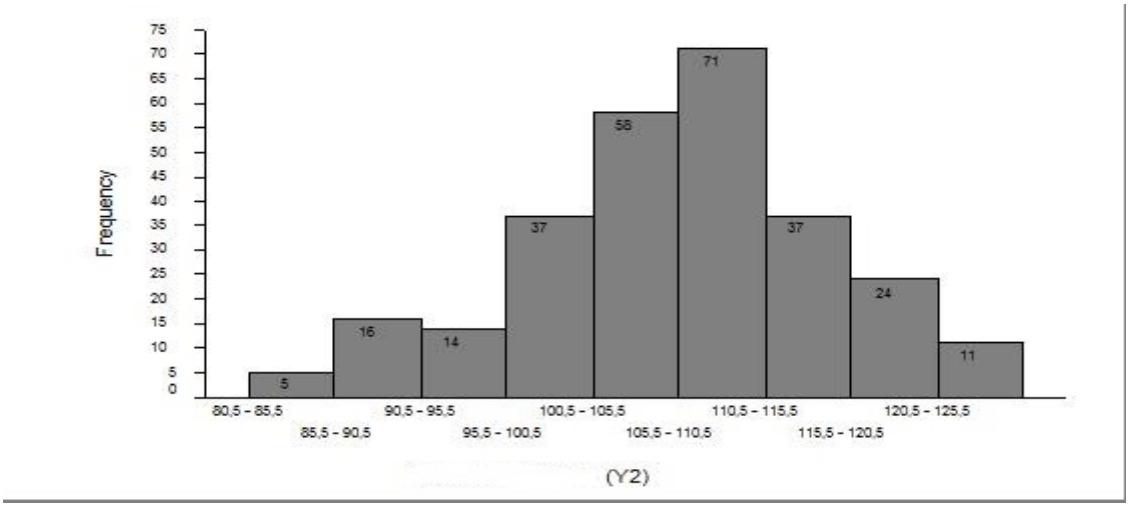

Figure 2: Histogram graph of job satisfaction (Y)

The data above showed that the score of job satisfaction with the highest frequency/ number of respondents was ranged from 81.5 up to 97.5 (interval classes: three and four) as many as 273 respondents or the same. Based on frequency distribution data, the score of frequency is smaller than mean-1SD as 17 or 20.23%, the score of frequency from -1SD to + 1SD was 66 or 59.54% and the frequency of the above score was +1SD as many as 17 or 20.23%. Thus, it can be said that job satisfaction experienced by lecturers of Jambi University was in "medium" level.

Job Motivation Variable (X3)

Job motivation variable was measured through questionnaires consisted of 27 statements, using a scale of 1-4 where respondents chose the answer option in which score 1 is for strongly disagree, score 2 is for disagree, score 3 is for agree, and score 4 is for strongly agree. Based on the data obtained then processed statistically, the result was as follows.

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Average Score

$$\overline{X}_3 = \frac{\sum X_3}{n} = \frac{7639}{84} = 90{,}94$$

Standard Deviation and Variance

$$Var_3 = \sqrt{\frac{n\sum X_3^2 - (\sum X_3)^2}{n(n-1)}} = \sqrt{\frac{84x(707207) - (7639)^2}{84x(83)}} = 150{,}755$$

$SD_3 = 12{,}278$

Frequency Distribution: The frequency distribution is based on the Sturges rule, Range: R = 118 - 66 = 52, Number of classes: k = 1 + 3.3 log (84) = 7.35, rounded to = 8, The length of interval class: p = 52 / 7,35 = 7.074, rounded to 8, Lower limit of the interval class is 61.5. Based on the value, the frequency distribution is presented in Table 2 below;

Table 3: Frequency distribution of data group on job motivation variable

Job Motivation (Y1)		Frequency	Valid Percentage	Cumulative Percent
Group Data	74,5 - 78,5	7	2,6	2,6
	78,5 - 82,5	13	4,8	7,3
	82,5 - 86,5	26	9,5	16,8
	86,5 - 90,5	46	16,8	33,7
	90,5 - 94,5	66	24,2	57,9
	94,5 - 98,5	50	18,3	76,2
	98,5 - 102,5	40	14,7	90,8
	102,5 - 106,5	20	7,3	98,2
	106,5 - 110,5	5	1,8	100,0
	Total	273	100,0	

Table 4: Job Motivation (Y1)

Job Motivation (Y2)		Frequency	Valid Percentage	Cumulative Percentage
Average Group Data	Low	46	16,8	16,8
	Medium	174	63,7	80,6
	High	53	19,4	100,0
	Total	273	100,0	

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Modus

$$M_0 = b + p\left(\frac{b_1}{b_1 + b_2}\right) = 94$$

Median

$$Me = b + p\left(\frac{0{,}5n - F}{f}\right) = 90$$

The graph of the histogram is shown in Figure 3 below:

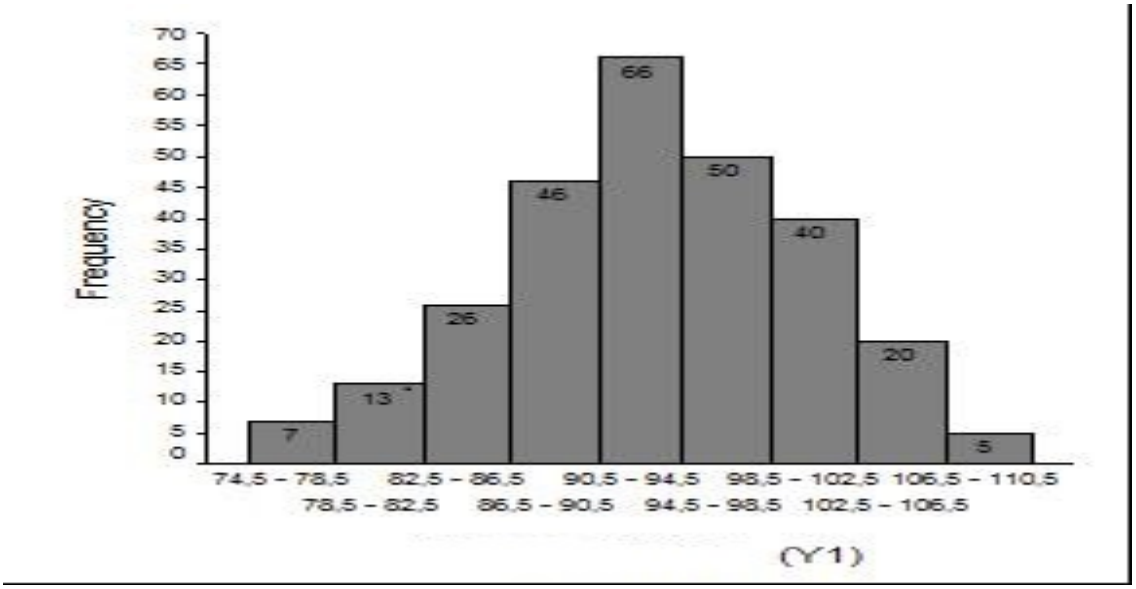

Figure 3: Histogram Chart of Job Motivation (X3)

The data above showed that Job Motivation score with the highest frequency / number of respondents was ranged from 77.5 to 85.5 (third interval class) as many as 21 respondents or 25%.

Job Characteristic Variable (X2)

Job Characteristic variable was measured through a questionnaire consisted of 28 statements, using a scale of 1-4 where respondents chose the answer option in which score 1 is for strongly disagree, score 2 is for disagree, score 3 is for agree, and score 4 is for strongly agree. Based on the data obtained then processed statistically, the result was as follows.

Average Score

$$\overline{X}_2 = \frac{\sum X_2}{n} = \frac{7924}{84} = 94{,}33$$

Standard Deviation and Variance

$$Var_2 = \sqrt{\frac{n\sum X_2{}^2 - (\sum X_2)^2}{n(n-1)}} = \sqrt{\frac{84x(759224) - (7924)^2}{84x(83)}} = 141{,}28$$

SD = 11,88

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Frequency Distribution

The frequency distribution is based on the Sturges rule: Range: R = 119 - 66 = 53Number of classes: k = 1 + 3.3 log (84) = 7.35, rounded to = 8, Interval length class: p = 53 / 7, 35 = 7.21, rounded to = 8, Lower limit of the interval class is 61.5. Based on the value, frequency distribution of job characteristic variable is presented in table 3 below.

Table 5: Frequency distribution of group data on job characteristics variable

Group	Range	Frequency	Percentage	Cumulative Percentage
1	61,5 - 69,5	2	2.38	2.38
2	69,5 - 77,5	2	2.38	4.76
3	77,5 - 85,5	18	21.43	26.19
4	85,5 - 93,5	22	26.19	52.38
5	93,5 - 101,5	17	20.24	72.62
6	101,5 - 109,5	11	13.10	85.71
7	109,5 - 117,5	11	13.10	98.81
8	117,5 - 125,5	1	1.19	100.00
Total		84	100	

Table 6: Job Characteristics (X2)

Job Characteristics (Y2)		Frequency	Valid Percentage	Cumulative Percentage
Average Group Data	Low	33	12,1	12,1
	Medium	192	70,3	82,4
	High	48	17,6	100,0
	Total	273	100,0	

Modus

$$M_0 = b + p\left(\frac{b_1}{b_1 + b_2}\right) = 93{,}00$$

Median

$$Me = b + p\left(\frac{0{,}5n - F}{f}\right) = 93{,}00$$

The histogram graph is presented in Figure 4 below.

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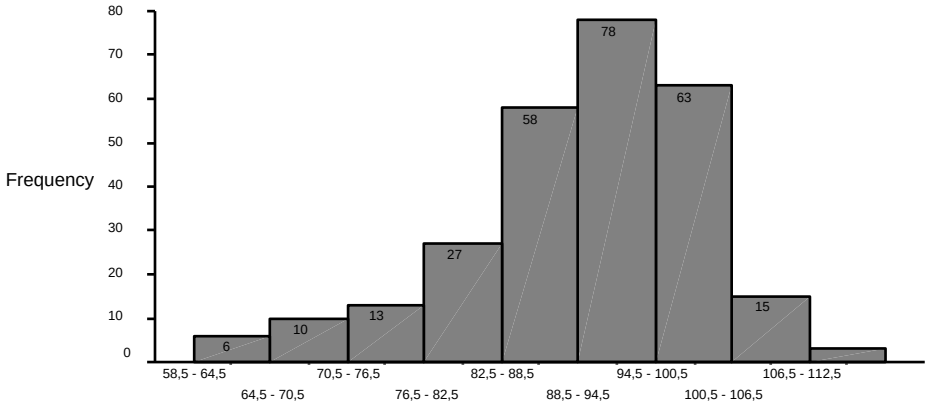

Figure 4. Histogram chart of job characteristics (X2)

The data above showed that the score of job characteristics with the highest frequency / number of respondents was between 85.5 up to 93.5 (fourth interval class) 22 respondents or 26.19%.

Working Environment Variable (X1)

Working environment variable was measured through questionnaires consisted of 30 statements, using a scale of 1-4 where respondents chose the answer option in which score 1 is for strongly disagree, score 2 is for disagree, score 3 is for agree, and score 4 is for strongly agree. Based on the data obtained then processed statistically, the result was as follows.

33

Average Score

$$\overline{X}_1 = \frac{\sum X_1}{n} = \frac{7773}{84} = 92{,}54$$

Standard Deviation and Variance

$$\text{VAR}_1 = \sqrt{\frac{n\sum X_1^{\,2} - (\sum X_1)^2}{n(n-1)}} = \sqrt{\frac{84x(729885) - (7773)^2}{84x(83)}} = 127{,}77$$

$$\text{SD}_1 = 11{,}304$$

Frequency Distribution

The frequency distribution is based on the Sturges rule: Range: R = 117 - 68 = 49. Number of classes: k = 1 + 3.3 log (84) = 7.35, rounded to= 8. Length of interval class: p = 49 / 7,35 = 6,66, rounded to = 7. Lower limit of the interval class is 64.5. Based on these values, the frequency distribution of data is presented in Table 4 below:

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Table 7: Frequency distribution of group data on working environment variable**(X1)**

Working Environment (X1)		Frequency	Valid Percentage	Cumulative Percent
Group Data	55,5 - 62,5	5	1,8	1,8
	69,5 - 76,5	22	8,1	9,9
	76,5 - 83,5	52	19,0	28,9
	83,5 - 90,5	53	19,4	48,4
	90,5 - 97,5	57	20,9	69.2
	97,5 - 104,5	59	21,6	90,8
	104,5 - 111,5	25	9,2	100,0
	Total	273	100,0	

Table 8: Working Environment (X1)

Working Environment (X1)		Frequency	Valid Percentage	Cumulative Percentage
Average Group Data	Low	55	20,1	20,1
	Medium	176	64,5	84,6
	High	42	15,4	100,0
	Total	273	100,0	

Modus

$M_0 = b + p\left(\frac{b_1}{b_1 + b_2}\right) = 85$

Median

$Me = b + p\left(\frac{0{,}5n - F}{f}\right) = 92$

The histogram graph is presented in Figure 4 below:

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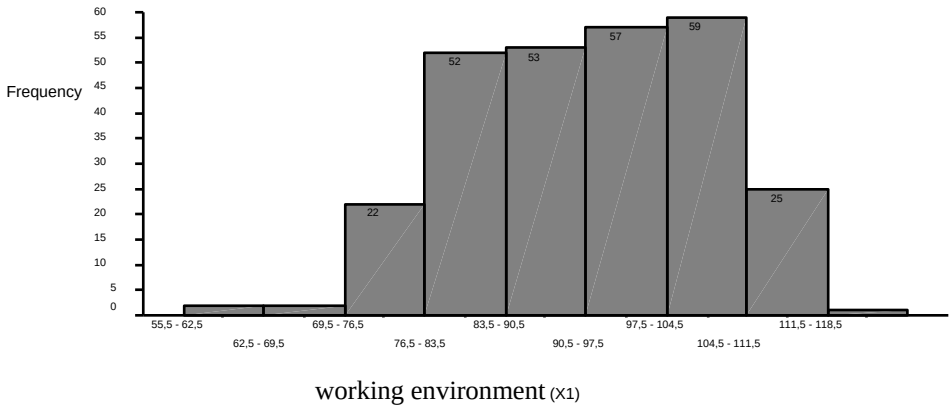

Figure 4. Histogram graph of working environment (X1)

The data above showed that the score of working environment with the highest frequency / number of respondents was ranged from 85.5 to 92.5 (fourth interval class) 20 respondents or 23.81%.

Hypothesis Testing

Direct effect of working environment (X1) on working motivation (X3)

The first hypothesis formulation to be tested is: Ho: There is no direct effect of working environment on job motivation, or statistically formulated Ho: p31 = 0. H1: There is a direct effect of working environment on job motivation, or statistically formulated H1: p31 ≠ 0. Decision rule: If 0.05 ≤ Sig then H0 is accepted and H1 is rejected, it means that the path coefficient is not significant. If 0.05 ≥ sig then H0 is rejected and H1 is accepted, it means that the path coefficient is significant. From the results of statistical calculations used the SPSS program, it is obtained calculation results as presented in the following table 5;

Table 9: The Coefficients[a] of the effect of working environment variable on job motivation variable

Variable	Unstandardized Coefficients		Statistics Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	36.844	9.424		3.910	.000
Working Environment (X1)	.585	.101	.538	5.782	.000

a (X1) (Dependent Variable: Job motivation (X3)

Based on the statistical calculation data, the effect of working environment (X1) on job motivation (X3) was 0,538 with coefficient t arithmetic is 5,782 and 0.05> sig. Then Ho is rejected and accepts H1 statement. Thus it can be said that the hypothesis proposed by the statement; there is a direct effect of working environment on job motivation empirically acceptable. With the rejection of Ho hypothesis, it is believed empirically that working environment has a positive and significant effect on job motivation. In other words, high variation in low motivation of the lecturers in Jambi University is influenced by working environment.

Direct Effect of Working Environment (X1) on Job Satisfaction (Y)

The second hypothesis formulation to be tested is: Ho: There is no direct effect of working environment (X1) on job satisfaction (Y), or statistically formulated Ho: p41 = 0, H1: There is a direct effect of working environment (X1) on job satisfaction (Y), or statistically formulated H1: p41 ≠ 0. Decision rule: If 0.05 ≤ Sig then H0 is accepted and H1 is rejected, it means that the path coefficient is not significant. If 0.05 ≥ sig then H0 is rejected and H1 is accepted, it means that path coefficient is significant. From the results of statistical calculations used the SPSS program, it is obtained calculation results as presented in the following table.

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Table 10: The Coefficients[a] of effect of working environment on job satisfaction

Variable	Unstandardized Coefficients		Statistics Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	36.606	9.640		3.797	.000
Working Environment (X1)	.614	.103	.549	5.941	.000

a (X1) (Dependent Variable: Job satisfaction (X4)

From the table above, we can see that the coefficient of beta on working environment variable (X1) on job satisfaction variable (Y) is 0,549, with t count coefficient of 5.941 and 0.05> sig. Based on these results, then Ho is rejected and H1 statement is accepted. Thus, it can be said that hypothesis proposed by statement; there is direct effect of working environment on job satisfaction, and it can be accepted. With the rejection of Ho hypothesis, it is believed empirically that working environment has a positive and significant effect on job satisfaction. In other words, the variation in low level of job satisfaction of the Lecturers in Jambi University is influenced by working environment.

Direct Effect of Job Characteristics (X2) on Job Motivation (X3)

The formulation of the third hypothesis to be tested is: Ho: There is no direct effect of job characteristics (X2) on job motivation (X3), or statistically formulated Ho: $p32 = 0$

H1: There is a direct effect of job characteristics (X2) on job motivation (X3), or statistically formulated H1: $p32 \neq 0$. Decision rule: If $0.05 \leq$ Sig then H0 is accepted and H1 is rejected, it means that the path coefficient is not significant. If $0.05 \geq$ sig then H0 is rejected and H1 is accepted, it means that the path coefficient is significant. From the results of statistical calculations used the SPSS program, it is obtained calculation results as presented in the following table.

Table 11: The Coefficients[a] of effect of the Job Characteristics on Job Motivation

Variable	Unstandardized Coefficients		Statistics Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	50.786	9.881		5.140	.000
Job characteristics (X2)	.426	.104	.412	4.095	.000

a (Dependent Variable: Job motivation (X3)

From the table above, we can see that beta coefficient of job characteristics on job motivation was -0.412, with t count coefficient of 4,095 and 0.05> sig. Based on these results then Ho is rejected and H1 statement is accepted. Thus it can be said that the hypothesis proposed with the statement; there is a direct influence of job characteristics on job motivation, and it can be acceptable. With the rejection of Ho hypothesis, it is believed empirically that job characteristics have a positive and significant effect on job motivation. In other words, high variation in low motivation of the lecturers in Jambi University is influenced by Job Characteristics.

Direct Influence of Job Characteristics (X2) on Job Satisfaction (Y)

The formulation of the fourth hypothesis to be tested is: Ho: There is no direct effect of job characteristics (X2) on job satisfaction (Y), or statistically formulated Ho: $p42 = 0$. H1: There is a direct effect of job characteristics on job satisfaction (Y), or statistically formulated H1: $p42 \neq 0$. Decision rule: If $0.05 \leq$ Sig then H0 is accepted and H1 is rejected, it means that the path coefficient is not significant. If $0.05 \geq$ sig then H0 is rejected and H1 is accepted, it means that the path coefficient is significant. From the results of statistical calculations used the SPSS program, it is obtained calculation results as presented in the following table.

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Table 12: The coefficient[a] of effect of job characteristics (X2) on job satisfaction (Y)

Variable	Unstandardized Coefficients		Statistics Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	52.816	10.227		5.164	.000
Job characteristics (X2)	.431	.108	.405	4.006	.000

a (Dependent Variable: Job satisfaction (X4)

From the table above, we can see that beta coefficient on Job Characteristics on Job Satisfaction is 0.405, with coefficient t arithmetic of 4.006 and 0.05> sig. Based on these results, then Ho is rejected and H1 statement is accepted. Thus, it can be said that hypothesis proposed by statement; there is direct effect of job characteristic (X2) on job satisfaction (Y), and it can be acceptable. With the rejection of Ho hypothesis, it is believed empirically that job characteristics (X2) have a positive and significant effect on job satisfaction (Y). In other words, the variation of high level of job satisfaction of the lecturers in Jambi University is influenced by job characteristics.

Direct Influence Work Motivation (X3) on Job Satisfaction (Y)

The formulation of the fifth hypothesis to be tested is: Ho: There is no direct effect of job motivation on job satisfaction, or statistically formulated Ho: p43 = 0, H1: There is a direct effect of job motivation on job satisfaction, or statistically formulated H1: p43 ≠ 0, Decision rule: If 0.05 ≤ Sig then H0 is accepted and H1 is rejected, it means that the path coefficient is not significant. If 0.05 ≥ sig then H0 is rejected and H1is accepted, it means that path coefficient is significant. From the results of statistical calculations used the SPSS program, it is obtained calculation results as presented in the following table.

Table 13: The coefficient[a] of effect of job motivation on job satisfaction

Variable	Unstandardized Coefficients		Statistics Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	39.774	8.567		4.643	.000
Job motivation (X3)	.590	.093	.573	6.324	.000

a (Dependent Variable: Job satisfaction (X4)

From the data, we can see that beta coefficient of job motivation on job satisfaction of 0.573 with t count coefficient of 6.324 and 0.05> sig. Based on these results then Ho is rejected and H1 statement is accepted. Thus, it can be said that the hypothesis proposed with the statement; there is a direct effect of job motivation on Job Satisfaction, and it can be acceptable.

Does working environment (X1) have an indirect effect on job satisfaction (X4) while have a direct effect on job motivation (X3)?

The formulation of the sixth hypothesis to be tested is: nHo: There is no working environment (X1) having an indirect effect on job satisfaction (X4) while directly affect the work motivation (X3) Ho: p143 = 0. H1: There is working environment (X1) that indirectly effects on job satisfaction (X4) while direct effect on job motivation (X3) H1: p143 ≠ 0. The calculation of the coefficient value of indirect effect X1 on Y2 through Y1 and the coefficient value of indirect effect of X2 on Y2 through Y1, as follows.

An indirect effect of X1 on Y2 through Y1

= (Effect X1 --- Y1) x (Effect Y1 --- Y2)

= PY1.1 x PY2.Y1

= 0.20739 x 0.47590

= 0.098695

An indirect effect of X2 on Y2 through Y1

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= (Effect X2 --- Y1) x (Effect Y1 --- Y2)
= PY1.2 x PY2.yY1
= 0.24162 x 0.47590
= 0.11498

Does Job Characteristics (X2) have an indirect effect on job satisfaction (X4) but have a direct effect on work motivation (X3)

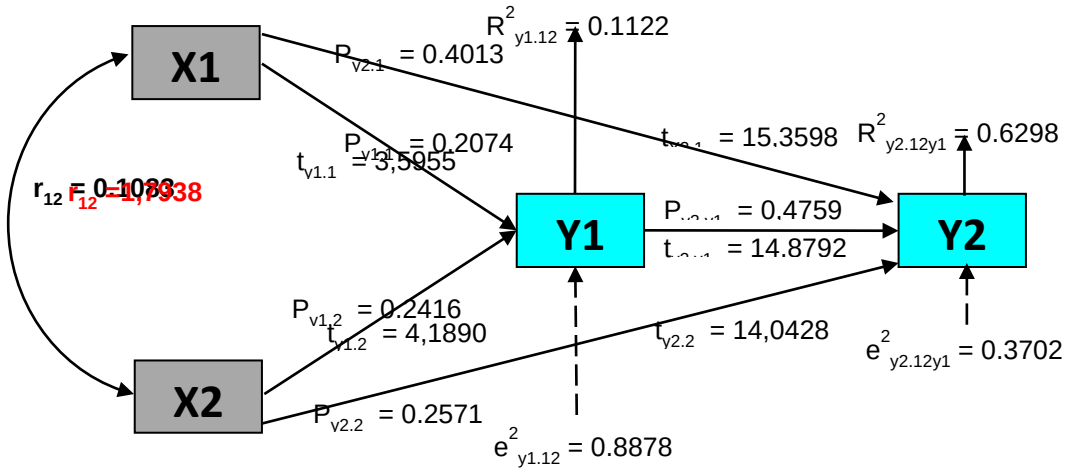
The formulation of the sixth hypothesis to be tested is: Ho: No Job Characteristic (X2) has an indirect effect on job satisfaction (X4) while has first direct effect on work motivation (X3) Ho: p243 = 0, H1: Job Characteristics (X2) has an indirect effect on job satisfaction (X4) but has a direct effect on job motivation (X3) H1: p243 ≠ 0. The calculation of the coefficient value of the total effect of X1 on Y2 and the coefficient value of the total effect of X2 on Y2, as follows.

An indirect effect of X1 on Y2 through Y1 + The direct effect of X1 on Y2

= (Effect X1 --- Y1) x (Effect Y1 --- Y2) + (Influence X1 --- Y2)
= PY1.1 x PY2.y1 + PY2.1
= 0.20739 x 0.47590 + 0.40132
= 0.500015

An indirect effect of X2 to Y2 through Y1 Direct influence of X1 to Y2

= (Effect X2 --- Y1) x (Effect Y1 --- Y2) + (Influence X2 --- Y2)
= PY1.2 x PY2.Y1 + PY2.2
= 0.24162 x 0.47590 + 0.25708
= 0.37206



With the rejection of Ho hypothesis, it is believed empirically that job motivation has a positive and significant effect on job satisfaction. In other words, the variation in low level of job satisfaction of the lecturers in Jambi University is influenced by job motivation.

LIMITATIONS OF RESEARCH

This study had some limitations both regarding the concept, methodology and analysis results; first, conceptually this study used the assumption of causality relationship between the variables affected job satisfaction, whereas the variables chosen to explain job satisfaction variables are only limited to variables of working environment, job characteristics, and job motivation. Due to the limitations, the dimensions or indicators chosen are also limited to dimensions or indicators that can be measured visually. Secondly, the research approach used quantitative method,

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whereas in the variables studied there are certain things that may not be approached quantitatively. One of the weaknesses is by choosing this quantitative method the researcher cannot dig deeper information. Third, the response of each respondent is limited to personal perceptions bounded by the dimensions of space, place and time. Respondents may be less careful because of mood or self-interest factors that can affect the response. Researcher is not able to fully supervise the sincerity and honesty of each respondent at the time of filling the questionnaire. Fourth, the data analysis using a tool of statistics that technically do a lot of rounding of numbers to simplify and facilitate the calculation. This can certainly lead to reduced accuracy in this study.

CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

Based on the results of data analysis as presented, the findings and conclusions of this study are; 1) there is a positive direct effect of working environment on job motivation. This means that good situation and working conditions affected the effectiveness of a person in working, will result in the emergence of encouragement within the lecturer of Jambi University to think, act, work and overcome any obstacles when they perform their duties. 2) There is a positive direct effect of working environment on job satisfaction. This means that good situation and working conditions influenced the effectiveness of a person in working, will result in the emergence of encouragement within the lecturers of Jambi University to think, act, work and overcome any obstacles. 3) There is a positive direct effect of job characteristics on job motivation. This means that the way of the lecturers in interacting with a good colleague, will lead to the emergence of encouragement within the lecturer to think, act, work and overcome any obstacles when performing their duties. 4) There is a positive direct effect of working environment on job satisfaction. This means that well interactions among lecturers will result in the emergence of feelings of pleasure, proud, and happy for Jambi University Lecturers on their work. 5) There is a positive direct effect of job motivation on job satisfaction. This means that well encouragement within the lecturers will lead to the emergence of feelings of pleasure, proud, and happy for Jambi University Lecturers on their work.

1) There is a positive direct effect of working environment on job motivation implied that working environment will affect the effectiveness of a person in working. Therefore, the arrangement of a good working environment will impact on the emergence of encouragement within a person to think, act, work and overcome any obstacles when performing their duties to be better. 2). Working environment directly affects positively to job satisfaction meant that working environment has a positive significant effect on job satisfaction. It includes two basic components of the physical working environment and psychological working environment, where those two components are closely interrelated. The physical working environment has an impact on the psychological comfort of the worker, as well as the psychological working environment having various effects on physical working conditions. If a worker gets a positive effect then she/ he will have better moral in doing her/ his job and this will increase job satisfaction to achieve the goals efficiently. When a worker gets a negative effect, she/ he will experience a moral decline in work, and consequently it will cause a job dissatisfaction, and waste or expenditure more than the cost that should be issued. 3) Job characteristics positively affects job motivation, it means that if job characteristics are chosen appropriately, they will lead to increase job motivation. This also means that the proper job characteristics, according to the situation and the level of maturity, will effect in increasing motivation of the lecturers in Jambi University. 4) Job motivation has a positive direct effect on job satisfaction. This means that motivation as a force existing within a person will effect on directions, intensity and persistence of her/ his behavior. A motivated person has willing to try directing her/ his behavior through an effort (intensity), for a certain time (persistence), and toward a particular destination (direction). If the business is carried out to satisfy various needs, it will have an impact on the increase of job satisfaction. 6) If working environment is well laid out, supported by high job motivation will result in increasing job satisfaction. If the physical working environment is well laid out in where inter and personal interactions are going well, the common goal is compatible with the goals of each individual, the group members having willingness and independence in doing the work, will generate excitement, enthusiasm and job satisfaction where members of the organization will feel happy and proud about their work.

Based on the findings and conclusions of the study, it also provides practical implications to improve job satisfaction. Therefore, joint efforts are required in the structuring of working environment, the characteristics of employment and maintenance of the best motivation. The key word is high commitment of the lecturers; (1) working environment needs to be managed in such a way that the physical working environment can create conducive conditions for the development of psychic working environment so that the lecturers in Jambi University can work more enjoy, energetically, and motivated to produce optimal performance. It will require efforts to improve job motivation as well as job satisfaction to organize and to create situation and working conditions affecting on the effectiveness in working. These efforts include; (a) giving autonomy to the subordinates, (b)

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forming a task orientation of lecturers in Jambi University, (c) each assigned task must have clarity, (d) open in innovation development, (e) each activity unit has a physical conformity, (f) minimizing work pressure, and (7) controlling regularly and continuously. (2) Maintenance job characteristics properly. The right work is a prerequisite for members of organization to motivate them in achieving high performance and job satisfaction. To achieve this required commitment, the lecturers of Jambi University need to maintain interpersonal relationships and streamline information in accordance with the required lecturers in Jambi University. Smooth flow of information and good interpersonal relationships will create conducive atmosphere to organizational life so that group cohesiveness within Jambi University can be well maintained, such atmosphere will lead to increase job satisfaction of lecturers in Jambi University.

Based on the statement of implications above, the suggestions are; 1) lecturers of Jambi University should have a high commitment to increase job motivation and job satisfaction. Jambi University is one of the most important assets, and job motivation and job satisfaction are very important aspects to achieve the effective performance in providing services with high quality. The right job motivation is the responsibility of the lecturers in Jambi University. 2) Rector should conduct systematic arrangement of working environment to create a conducive organizational climate. Additionally, comfortable, healthy and safe working environment are needed to increase job motivation and job satisfaction of lecturers in Jambi University. 3) Each department within the University / Faculty should be organized and directed to work together dynamically to achieve common and specific goals. The key word is the smooth flow of information and human relations that must be played by the leaders of the University. Besides, the role that should be played by each lecturer of Jambi University is to maintain a harmonious dynamics among others such; (a) devote all feelings of involvement in activities of the University; (c) endeavor to assist the achievement of common goals; (d) strive to obey the rules set by the University well, (f) be able to communicate openly, (g) seek to assist other departments within the University's internal scope, (h) provide an opportunity for Jambi University Lecturers to also actively participate in all activities; perform their role, and (i) realize the importance of the activities outlined by the University to achieve the University's goals, mission and vision. 4) Rector should improve the implementation of human resource development and the development of its management resources, so that they are ready for working hard and smart work, and have new paradigm to make Jambi University of Jambi more excellence and modern. 5) Research on job satisfaction should be expanded, not only limited in form of quantitative research, but also more comprehensive regarding to job satisfaction in terms of research types, both qualitative and mixed research in Jambi University.

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