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Message from the Editors

Dear researchers,

Publication of TOJNED, July 2013 were presentend to you with a great pleasure for the academic agenda. I would like to thank authors that they shared their valuable research papers. TOJNED is enhancing its quality by diffusing researches from different methodologies and context, In this respect, it is honor for us to get research papers in order to share in the academic world in the next issues of TOJNED

July 01.2013
Prof. Dr. Aytekin İŞMAN
Editor in Chief

TOJNED is an international journal that covers valuable different research articles. I am pleased to make together valuable researches in this issue. As TOJNED focuses on interdisciplinary view on developing its spectrum by dense different researches, it reflects its quality through published research papers in the issues.

I would like to thank researches and editorial team for their contributions to the academic agenda and the issue of TOJNED

July 01.2013
Prof. Dr. Cem
BİROL **Edior**

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Including Social Media Marketing With Gomc In An E-Business Course: A Preliminary Examination

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ABSTRACT

An Online Advertising Campaign Project (OACP) based on Google Online Marketing Challenge of 2012 (GOMC12) was integrated into an E-Business course paradigm. GOMC12 incorporated social media marketing component using Google+ with AdWords, the keyword advertising application. One of the OACP goals was promoting awareness of the use of social media platforms in marketing in a novel collaboration between community organizations in Palestine and business studies students at Bethlehem University. Twelve online advertising campaigns were conducted with 12 participating organizations. A participatory action research (PAR) methodology was used to identify the challenges and opportunities of OACP process as part of an E-Business course and to find out how that could impact students' knowledge and understanding. The findings of the study suggest that social media marketing and AdWords for participating in GOMC12 along with the E-Business course content proved somewhat overwhelming for the students, largely due to unanticipated challenges. Despite this finding, much was learned, providing strong evidence of the usefulness of this method in supporting student team-work, understanding and sense of community engagement.

Keywords: *Google+, Google Online Marketing Challenge, Google keyword advertising, Google Hangout, Community engagement, Participatory Action Research, PAR*

INTRODUCTION

In recent years, businesses have started to take advantage of the extraordinary capacity of social media platforms to reach thousands of potential customers. This paper discusses how teams of students of an E-Business university course at Bethlehem University in Palestine were paired with members from local businesses to conduct an **Online Advertising Campaign Project** (OACP). The global competition Google Online Marketing Challenge (GOMC) provided students with a hands-on experience for developing and executing online marketing campaigns and simultaneously engaging them with community organizations (Treiblmaier, Neal, & Murphy, 2009). OACP is based on Google Online Marketing Challenge of 2012 (GOMC12). GOMC12 incorporates social media marketing using Google+ (G+) social media platform and keeps this component as an optional choice to include in the execution of the online marketing campaign or not. This is the second year that Bethlehem University has participated in the global competition GOMC as part of an E-Business course. In anticipation of the possible challenges of the inclusion of social media in an E-Business course paradigm, the instructor conducted this study in an attempt to answer to the following questions:

a) What are the opportunities and obstacles of implementing OACP?

b) How does OACP impact students' subject knowledge and understanding?

This paper starts with a presentation of the background of the study and the theoretical framework that guided

the research, with particular attention to Participatory Action Research (PAR) which was adopted in this study. PAR "involves the investigation of actual practices and not abstract practices. It involves learning about the real, material, concrete, and particular practices of particular people in particular places" (Kemmis and McTaggart, 2007, p. 277). PAR also has significant learning consequences on all the collaborators throughout the study (Kindon & Elwood, 2009). The study design, the different stages of the implementation and the methods of data collection are then described. The findings emerging from the OACP engagements and the implications of their potential influence on the approach of teaching and learning of future offerings of the same or a similar course are presented at the end.

BACKGROUND OF THE STUDY

The OACP is based on GOMC12, which is a Google global competition program available from January to June for higher education institutions around the world in which teams of students run advertising campaigns for local organizations. This is a highly realistic experience where students work with real money to do an online text-based advertisement campaign in real time. The competition begins when a university professor who is registered on a GOMC platform approves the designated teams. Teams of students work with their clients to prepare an advertising strategy and record that in a report which should be uploaded on a GOMC platform. GOMC then offers each team a $250 coupon to credit the team's AdWords accounts to enable them to start their campaign (Google a, 2012).

GOMC12 incorporates the social media marketing using G+ with its core component Google keyword online advertising application (AdWords). However, those who elect to participate in GOMC12 have the choice to include G+ or not. AdWords is an application where teams create and run their text-based advertising campaign with its relevant keywords for three consecutive weeks. The text-based ads are displayed on a Google search engine page, and/or Google network partners. When an Internet user clicks on any of these ads, AdWords deducts the keyword cost from the $250 budget allocated to him/her. In this course, the instructor included G+, the second optional component of GOMC12 in OACP. The G+ process requires clients to create their G+ pages and assign team members as managers of those pages to run their G+ campaign for six consecutive weeks. In this G+ campaign, teams are required to prepare a social media strategy report and to conduct two Google Hangouts. A Google Hangout is where a small number of G+ page followers can conduct a video chat.

The decision to use GOMC12 for the OACP in the E-Business course was based on the instructor's previous experience of incorporating GOMC which was based only on AdWords in the syllabus of the same E-Business course in the spring 2011 semester. That effort resulted in a Middle East/Africa (MEA) regional winning team in the GOMC 2011 (Google a, 2013). This success prompted the offering of the course for a second time, with an added incentive to students to work toward their advertising campaigns including the new G+ addition. The GOMC experience is also found to be valuable to students since "such opportunities do provide important means for many students to become better versed in business practice" (Lavin, 2010). Another indication of the usefulness of and satisfaction with GOMC pedagogical experience in classroom implementation by professors was evident from the GOMC 2009 survey result, where the majority of professors surveyed indicated that they would enroll in the challenge again (Flaherty, Jansen, Hofacker, & Murphy, 2009).

Two sections of the E-Business course with a total of 60 students were offered in the 2012 spring semester. The students consisted of 42 female and 18 male students, of whom 43 were juniors and 17 seniors. The course was restricted to business major students with a minor in marketing. Those students can be considered as good users of the Internet, savvy in social media but not highly technical with regard to advanced computer applications. The approval of the students to participate in the study had been obtained early on. The students were divided into teams of five to six each. The teams carried online advertisement campaigns allowing 9 non-profit organizations and 3 businesses to deliver their marketing messages for six consecutive weeks.

The course syllabus included OACP along with other topics. Due to an unexpected ten-day delay in the onset of semester at Bethlehem University, the timetable previously planned to avoid the peak workload weeks during the

semester had to be revised to fit in with the revised semester dates. Despite expectations of having to work under time pressure, the instructor decided to go ahead with the study in order to investigate the students' reaction to the anticipated challenges.

To meet the need for a research methodology to the participatory aspect of OACP, participatory action research (PAR) was adopted because it provides a way for educators to learn from the direct classroom experience of the learners involved in the study (Krogh, 2001). Unlike traditional action research, latest versions of action research, such as PAR, involve all participants in the different stages of action research (Gaventa, 1988).

A variety of conflicting definitions of PAR are available (Quixley, 2008), but the following best matches the goals of the current study. At its core, PAR

is a collective, self reflective inquiry that researchers and participants undertake so they can understand and improve upon the practices in which they participate and the situations in which they find themselves. The reflective process is directly linked to action, influenced by understanding of history, culture, and local context and embedded in social relationships (Minkler, Wallerstein, & Grbich6 as adapted in Baum, MacDougall, & Smith, 2006, p.854).

The improvement is driven by the self-reflection of participants on their own actions. According to Kemmis & McTaggart (2007), this includes:

a spiral of self-reflective cycles that involves: planning a change, acting and observing the process and consequences of that change, reflecting on these processes and consequences, re-planning, acting and observing again, reflecting again, and so on. This process in reality might not be of neat self-contained cycles, stages might overlap, and initial plans quickly become obsolete in the light of learning from experience, (p.276).

However it was noted that many researchers use the self-reflective cycles as a "method of action research" and that these self-reflective cycles are a basic component of PAR.

To ensure the success of PAR, Savin-Baden and Wimpeenny (2007) stress the importance of creating an environment of commitment, responsibility and mutual ownership of the participants in order to assure them that they are valued and respected. However, they alert researchers that use of PAR poses a potential risk for the experimentation with the non-traditional paradigm. They also emphasize the importance of the validation methods in data collection when capturing the participants' experience within the research context. This holistic PAR practice prepares participants to acquire additional skills, competences and incremental construction of knowledge by reflecting upon their own circumstances.

PAR is suitable in OACP because its objectives are accomplished by all those who are involved. In this study the researcher worked closely with the students to assure that the teams had the technical hands-on experiences to work with Internet applications needed for GOMC12. The clients representing local businesses and nonprofit organizations provided student teams with actual information during the execution of the campaign to be used in the advertising strategy. The advertising strategy was formulated by both parties. Few serious problems occurred during the project execution that involved joint decision making of both the instructor and students. During the execution stage of the AdWords campaigns, the AdWords accounts of several teams were suspended by the AdWords administrator due to different reasons such as the double use of a client's website in different AdWords accounts. As a result, all teams unanimously sought an alternative fair solution on two assessment criteria of the course to continue with OACP.

PAR, with its self-reflective cycle in planning, acting and observing the changes then reflecting and re-planning, etc, was experienced at several stages in OACP. In AdWords the application records the tracking of all the modifications and additions in the AdWords campaigns. This feature is very important for teams in order to observe the performance of their ads and to modify their campaigns accordingly to improve the effectiveness of their campaign during the executions stage.

STUDY DESIGN

The E-Business course syllabus was divided into two distinct tracks and took place in a fifteen-week semester. The first track concentrated on E-Business such as electronic commerce business models, e-market places, Web2.0 environment and privacy protection. The second track dealt with OACP and related subjects with the technical application skills needed for the logistics of the course. The marking and assessment criteria of the learning outcomes of the course were 65% for the OACP and 35% for the E-Business.

The present study focused on the OACP part of the E-Business course and had three overlapping phases stretched along the whole semester.

Phase I: covered general knowledge and background of keyword advertisement, social media marketing as well as GOMC12 and its preparation process. This phase was important in setting up and facilitating the students' engagement in the project and in gaining background knowledge. The tutoring was mainly delivered by the instructor to give the students the ownership of the project according to PAR, but randomly selected students delivered some OACP related issues. A summary of the students' work was posted on the publicly open course blog http://bu266.blogspot.com. Two senior students and previous winners of MEA region GOMC 2011 were also invited as guest speakers to share their experience in GOMC.

Because dealing with AdWords platform and Google Hangout (Hangout) requires knowledge and skills that the course could not cover, the instructor offered some extra class sessions to introduce students to such knowledge and skills. Acquiring new computer application skills could prove daunting to social media savvy students, particularly those who do not have time to invest in practicing (Lachapelle, 2011). Therefore, two hands-on sessions on using AdWords were arranged in the computer lab. With regard to Hangout, the instructor's efforts focused mainly on problems that students might encounter when using Hangout such as technical issues due to the limited Internet connection speed. The instructor, therefore, scheduled additional night time online meeting sessions with teams through Hangout. The meetings helped teams to test the different Hangout features and proved to be very handy, particularly when they formulated their Hangout activities with external customers.

Since team work is one of GOMC requirements, after dividing the students into teams, the instructor arranged a team building activity by meeting with each individual team separately. The Helium Stick team building exercise (North Georgia College & State University, 2012) was used to emphasize the importance of coordination among team members to achieve a common goal. The Helium Stick is a long, thin, light rod that was held by the members' index fingers and their task was to lower the stick to the ground without losing contact of it at any time.

To simulate the formation of small advertising companies by the different teams, a firing team member policy was given to each team (Bergman, 2010). As a result of enforcing the firing policy by some teams and the subsequent expulsion of several team members, the instructor decided to form a new team comprising the expelled members. To teach the students collaborative writing, they were shown the advanced features of Google Documents with special emphasis on discussion through live chat which was built in the program.

Phase II: focused on student collaboration and interaction with the real world. A guest lecturer was invited to talk about how students could gain knowledge from different sources. This proved to be a good eye opener. The lecturer, a fairly young entrepreneur, discussed the successes and failures in his start-up company and how social media marketing and G+ were utilized in his work.

Identifying clients who were willing to participate in OACP was a difficult endeavor for some teams, not because businesses were not willing to cooperate, but because the students had not developed sufficient interaction experience at the start of the course. As a result, the instructor initiated phone calls with each client in order to explain the OACP process and its benefits. Teams later met with their clients in person and established an understanding of the responsibilities of each side and an online advertising strategy was formulated jointly.

Phase III: started with the simultaneous execution of online advertising campaigns for both AdWords and the G+. The first campaign lasted three weeks and the next one continued for another three weeks. During the execution of the campaigns, teams were in close contact with their clients in order to brief them on new developments and to get a business update from their clients. The OACP concluded when teams presented the results of their online advertising campaign in the presence of their clients. The presentations were videotaped after acquiring the students' approval of the students.

DATA COLLECTION

Three methods of data collection were used: (1) reflective diaries, (2) group discussions, and (3) the leaning component section from the GOMC12 post-campaign report. The data collected from various methods were compiled and coded according to the phases of the study in order to develop a better approach to the analysis (Berg, 2004).

Since PAR is a participatory approach, the self reflection of the participants becomes important in giving them the sense that they are important contributors to the OACP and the outcome of the study (Ozanne & Saatcioglu, 2008). The students were asked to write *reflective diaries* about their involvement and the challenges they faced. Although the reflection task was required of all students, only twelve students 'volunteered' to keep a reflective diary for the purpose of the study. The students were assured that their diaries would be kept anonymous.

A Google document was created for each volunteer; the instructor had open access to each of these documents. The instructor followed an "open" reflection and did not provide the volunteers with specific questions to reflect on, so students were free to select any aspect to reflect on. However, the instructor posted in each document a few hints about reflective writing quoted from Moon (2004):

Your reflective *writing should include any of the following: self-questioning about these experiences, an honest appraisal of your experience*.

What did I learn from this experience? What was bad about it? What would I like to change and why?

The students were, therefore, encouraged in a rather indirect manner to reflect on any activity or aspect of the course freely using an open-ended style. It was noticed that, during the peak load study weeks, the input into the reflective diaries was minimal.

The data from the *group discussions* were informally conducted during class time. The most important group discussion was the evaluation meeting that was conducted after the semester was over. The meeting was attended by 10 students only who approved the recording of the meeting.

The last type of data provided a summative view in writing from the teams' perspective adopting the *learning component* section for the post-campaign report from GOMC12 guideline **(**Google b, 2012).

FINDINGS

Four themes emanated from the different data resources as discussed below. It is worth mentioning that these themes reflected change on the academic and personal level as reported by the students. Those themes provide answers to the study question in finding obstacles and opportunities to improving teaching methods and enhance the student subject knowledge.

Enriching Students' Content Knowledge

Contextual understanding and knowledge construction can come from classroom interaction, collaboration with teams, clients and online communities (Hammond, Hicks, Kalman & Miller, 2005). The following paragraphs review how the employment of the adopted PAR methodology made learning come from an array of sources.

The postings of the student teams on their G+ pages were used as a source of information for other teams. The privacy settings for G+ page were open to the public to allow easy access to the page and assist in attracting and interacting with followers from the Internet users. This feature encouraged the instructor to use PAR methodology for the project. The free accessibility of G+ pages to the public and to other teams gave teams a chance to observe and learn from the work of other teams and encouraged competition.

A diary note stated:

It's the first time we were doing something in front of everybody about our campaign and we saw how the other groups did theirs and compared it with ours. In my opinion, we kind of knew exactly what we wanted to do.

Another student noted:

Looking at other pages, one couldn't understand what they were doing but during their presentation *to the client one could understand that they were posting something to attract a certain type of followers.*

The interaction with real clients and G+ page followers did provide life knowledge that students do not usually learn from textbook but from life experiences. One comment showed how the client intervened when a photo was posted on a team page showing an activity of the client including kids with special needs. The client informed the team that this was not in compliance with the ethics of Palestinian culture and personal data protection.

In the PAR methodology in knowledge construction, the online advertising campaigns are the core for the OACP. One student wrote about this experience:

For me it was a completely new marketing tool and it was really useful. Actually I have learned how *to reach our campaign target market in the right way and also how to promote using the Internet. I've learned to implement my marketing knowledge from the different courses I've gained from real work.*

Figure (1) below depicts the practices of the different teams in their exploration of the impact of their online advertising campaigns and what they had to do to improve their tactics. The figure combines the spiral self-reflective cycle of Kemmis and MaTaggart (2007) with Plan-Do-Check-Act cycle of continuous improvement used in quality management (Vonderembse & White, 2004).

The right vertical line indicates the degree of improvement for the participants' knowledge construction. The left vertical line shows the impact on the virtual community after each round of self-reflective cycle. The circle in the figure rolls upwards clockwise. As time passes and students assess what has been done, they use the acquired knowledge that they have gained along the way to move to the second cycle. If a round of plan-act-observe-reflect cycle didn't achieve any impact, the circle would loop in its place. This might give an indication that no learning has taken place.

The learning part of AdWords became evident for most teams when their text-based ads started appearing on Google search results pages and when teams found how those ads drove traffic to their clients' websites. Concepts in the context of AdWords such as keywords, impressions, click-through rate and cost per click were at first difficult to grasp. Introducing those concepts theoretically to students with minimal knowledge in information technology terminologies added to their difficulties in comprehension. With time, however, the plan-act-observe-reflect cycle, which was employed by the students in the implementation of these campaigns, improved their learning process and acquiring of knowledge. The tracking and analysis tools in AdWords made it easy to observe the effect of every single change teams make in their campaigns. From group discussions a student said:

At the beginning, the knowledge we had gained in the classroom was good enough to start the campaign*, but while running the campaign we started to understand the meaning of many of those terms, and our campaign performance improved with time*.

Admittedly, this year's participation and advertising campaign did not run as smoothly as last year's. Most of the teams' AdWords accounts were suspended for a while. After 2 or 3 days of running the campaign, the accounts of five teams were suspended for a variety of technical reasons, such as problems relating to AdWords and multiple accounts. For example, during the hands-on session, teams practiced creating a campaign on their personal AdWords account. Some students used their clients' websites for practice, but when the team created their campaign for the same client, the campaign was suspended because this was against AdWords Terms and Conditions. In another case, the suspension was due to the content of their client's website. The client's website included the name of a branded company for which the client had no license to use. This was in clear violation of the AdWords website policy and so the account was suspended. It took the team at least one week to identify the reason behind the suspension.

Such experiences were discouraging to the team members who were dismissed from GOMC12 against their will. Nevertheless, this taught them some good problem-solving techniques as they had to communicate with GOMC support, AdWords support, AdWords and GOMC community, read many AdWords Terms and Conditions and even call Google's regional office. The students' reactions to those who tried to solve their campaign problems but could not run their campaign were mixed, particularly to those who were motivated by the competitive part of GOMC12. One student went into a "withdrawal mood" as it was noted the following:

Now we are out of the competition (unfortunately). It seems that my fellow group members thought *we could end the course. They are not putting any effort into the G+ page. Only two of us are posting new things. Even in writing, the reports rarely helped us. Thank God, the semester has come to an end. This course made me hate group work.*

But another commented on the experience in a more positive way:

I admit that I wanted to compete in AdWords, but if things went perfect then the value that I would gain would be less, because in real life there are many barriers.

Enhancing Collaboration and Team Work

The Helium Stick exercise was employed to give the students a sense of the importance of collaboration with their OACP. Unfortunately, systematic notes were not made on the performance of the teams during the exercise. A quick observation on the dynamics of the teams during the exercise and after the project has ended could serve as a valid indicator on how Helium Stick exercise can predict coordination performance among team members. An example which could illustrate the experience was that one team kept postponing their meeting for this exercise due to poor coordination among themselves. At a later stage, this team expelled one of its members, according to the policy announced to the students at the beginning of the semester. Although the expelled students from different teams harbored resentment and all parties were stressed during the firing stage, this process stood out as a learning experience. A note from a dismissed team member reflects this experience:

I've learned from my mistakes how to deal with different situations that I faced. I started to like working *together. The most important thing in teamwork is cooperation and respect of deadlines and commitment.*

The issue of coordination among teams and its contribution to the success of the team was addressed by the guest speakers. This point was highlighted in a diary:

The presentation *of last year's GOMC winners encouraged me to read more GOMC guidelines and cooperate more with my group*.

Time pressure and course load were significant challenges the students had to face. During the evaluation meeting many agreed that:

… time pressure was one of the difficulties that we faced. Because the project consumed a lot of time, we did *not concentrate on the other courses as much as we did on the GOMC project. However, with the passage of time this difficulty weakened because we learned how to manage our time more effectively.*

The last comment cannot be generalized as two teams and other team members involved in their senior seminars neglected their duties in the last stages of the project. Interested team mates had no choice but to complete the tasks.

The Hangout tool turned to be very handy to some teams because they reported having a consultation meeting with their client using Hangout. Other teams used the Hangout night meetings to work on their project as they reported that getting in contact with other members at night was much easier than during daytime.

Team report writing was another area that needed special team coordination as teams were required to write four reports according to GOMC12 guidelines. To ease the coordination in writing, the teams were encouraged to use Google Documents. This was not convenient because some team members did not have access to the Internet. Going through the diary notes, it could easily be detected that team members were struggling to coordinate responsibilities of the first report among themselves. However, with the second report, teams started to bring in their own working mechanisms, as we can sense in the following diary note:

I was really satisfied with what I wrote today and what my mates wrote as well. Every one put his own ideas and thoughts on Google Doc and we came up with something good! Step by *step we'll be hopefully better. There were too many comments from the instructor; by the way, who will modify the report was based on prior agreement among us. In terms of writing reports my skills have improved, I became careful about the smallest details that can affect the first impression*

Another mechanism that was shared in the evaluation meeting and which seemed to work for this team is reflected in the following diary entry:

The way it worked for us was to meet as a group to discuss all the points, then distribute the work in a way *that each one of us would write his/her part, then putting the work together and finally each one reviewing the whole document to present a final report.*

There was a serious coordination problem among the various team members as was evident from a good number of diary entries. The team size (5-6 members) could be one of the reasons for the lack of coordination. During the evaluation meeting there was a consensus that team size for such projects should be limited to 3-4 members.

Enhancing the Sense of Community Engagement among Students

In this project, the clients learned how to employ targeted social media marketing campaigns at a very low cost. They also experienced the effectiveness of online advertising in driving traffic into their website during the campaign.

At the start of the OACP, some students were hesitant to reach out to local organizations to establish their involvement in the project. This step placed the students out of their university comfort zone as they had to deal with real people. But the team work nature of the project encouraged students to get together and meet with their clients in person.

In addition, the teams dealt with Internet users for the G+ part of the project. This was necessary to build their own network and resources in order to have an effective advertising campaign for their client. The interaction with the Internet community enhanced the subject matter of the students as described below*:*

Getting followers and interacting with them led us to notice that every follower had his own purpose when *he decided to follow the page, which made us aware of all the possible purposes we might face in future experiences.*

Another diary note reflected on the challenges in the online environment about determining the market segment as noted:

We segment our market and then target it, but after targeting it we didn't know if we had delivered the right message to the right people and we had difficulties to figure that out.

Clients, particularly nonprofit organizations, were not familiar with social media and its use in marketing for their business. Therefore, teams had difficulty communicating the basic information needed to attract or convince clients to participate. One team reported in their learning component section about their client:

… every time we wanted to talk with our client about our campaigns, we had to explain every concept in *order for them to understand us*.

The G+ part of the project required clients to create their own G+ pages and assign team members as managers to it. Not all of the clients were aware of G+ platforms. Therefore, some team members took the responsibility to walk-through the steps in creating the page with their client in person. One student said,

Our clients learned from *us more than we tried to learn from them but they were helpful to us, too.*

As planned, the teams presented the results of their online advertising campaign in the presence of their clients near the end of the semester. The importance of the presentations was clearly expressed by the following diary entry:

The presentations *were good because they made us feel proud of the efforts we've exerted through-out the whole project were acknowledged*.

On the other hand, the presentation to a real client added some pressure to the senior students taking this course. The senior graduation seminar presentations were re-scheduled by the department and that caused some timetable clashes and conflicting priorities for some students between the graduation seminars and the course presentation, which led some teams to miss the important presentation for their client.

Improving Teaching Methods

In OACP, the instructor's role varied according to the situation at the particular moment during the semester. One of the objectives of this study was to find a better way to conduct the course and in the meantime to take advantage of the GOMC program. The planning and preparations of all the participants was an important factor in the effectiveness of GOMC12.

Starting with the problem of allocating clients, the process could have been conducted faster had the instructor helped the teams to locate their clients at the very beginning, particularly as it was found that the students were able to comprehend the task only after they started to execute their advertisement and capturing the concept. This was expressed in a diary note:

We used to hear terms in class and did not know what they meant. When met with the clients, we didn't know

what to explain to them. But after the campaign started, I was able explain what these terms meant.

Another approach of giving the students a comprehensive view of the project is to invite guest speakers who are expert in the field of online advertisement. This was successfully done in this study. A young entrepreneur was invited to talk to the students about social media marketing and G+, and how it was used in his company. The presentation was quite motivating and caused genuine enthusiasm among the students. This was reflected in all diaries as in the following two selected comments:

I really enjoyed *Mohammed's lecture and I think it's very useful and a novel way of learning about something*.

Actually I gained *many new ideas, things that will help me in the course, such as G+ and its Hangout.*

The use of an AdWords hands-on session during the GOMC preparation was recommended by Jansen, et al. (2008). In this study, the students who took the course recommended that these sessions be conducted during class time so that all students participating in the study will have a similar background. This evidently boosts coordination among team members. Furthermore, during the final evaluation meeting, students pointed to the difficulties they had in dealing with teammates who had not attend the hands-on sessions.

Several mishaps occurred during the AdWords campaign. Five teams couldn't run their AdWords account because their accounts were suspended for several reasons. This caused unnecessary anguish and stress to the students and the instructor alike. Such a situation is expected with PAR as indicated by Kindon and Elwood (2009, p. 25):

Students may feel scared by the unpredictability of PAR or uncertain when lecturers do not immediately *appear* always to know how best to proceed. Lecturers too may lose confidence in the face of unexpected challenges or unforeseen 'mistakes'.

The instructor's main concern regarding such issues is the fair assessment of the coursework and students efforts. An alternative evaluation method might be included in the course syllabus; this step might reduce tension.

The Hangout feature might provide instructors, during as well as after the project, with opportunities to connect with students for consultation during the evening time. This point was taken from a diary entry as

… finally we tried *to hangout all the group members with our instructor. It was sort of fun because it was the first time we communicate with a teacher on a video chat and at night.*

IMPLICATIONS AND CONCLUSIONS

The findings of this research were mainly based on volunteer teams who participated in both the reflective diary and the evaluation meeting data collection methods. Asking students to volunteer to keep a reflective diary could have been a faulty decision by the instructor, who was a new comer to PAR methodology. The academic level of the volunteering students who were active in the various data collection methods was higher than the average students. The students with the minimal input in their reflective diaries fall within the class average. This might point to certain hidden possible problems which the non-volunteering students had encountered with OACP.

GOMC12 provided learners with subject knowledge and enhanced the students' transferable skills through their interaction with the public, their clients, and their peers. The note below substantiates this conclusion:

...these internal group problems improved my leadership skills in terms of how I can deal with people who don't follow rules, don't work and don't have any commitment. Now I feel very confident about myself and my abilities.

The participation in GOMC12 resulted in two qualified teams among the finalists for the MEA region; one team was also chosen to be the Social Media Award winning team for GOMC12 MEA (Google b, 2013). However, the instructor's choice not to consider G+ as a mandatory part for the next offering of the course came partially because the students were overwhelmed by the work load they had to put every week, which was much more than the time and effort required for a 3 credit hours course.

Finally, one lesson that was learned is that it is important for an instructor who wants to incorporate GOMC into his/her courses to emphasize the educational aspect of the challenge as well as the hands-on learning experience.

REFERENCES

Baum, F., MacDougall, C., Smith, D. (2006). Participatory action research. Journal of Epidemiol Community Health, 60, 854-857. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566051/

Berg, B. L. (2004). Qualitative research methods for the social sciences. Person, 5. Retrieved from http://digilib.bc.edu/reserves/sc210/piat/sc21007.pdf

Bergman, B. (2010). Policy for Firing a Member of a Work Team, 25-376-2 Strategies of E-Business & E-Marketing. Lewis University, unpublished.

Flaherty, T., Jansen, B., Hofacker, C., Murphy, J. (2009). Insights on the Google Online Marketing Challenge and Its Successful Classroom Implementation. Journal of Online Learning and Teaching, 5(2), 446-457. Retrieved from http://jolt.merlot.org/vol5no2/flaherty_0609.htm

Gaventa, J. (1988). Participatory research in North America. Convergence, 21(2/3), 19-27.

Google a, (2012). Google Online Marketing Challenge: About the Challenge. Google. Retrieved from http://web.archive.org/web/20111127035324/http://www.google.com/onlinechallenge/about.html

Google a, (2013). 2011 Google Online Marketing Challenge Winners. Google. Retrieved from http://www.google.com/onlinechallenge/past/winners-2011.html

Google b, (2012). Google Online Marketing Challenge: Competition Guidelines 2012. Google. Retrieved from http://web.archive.org/web/20120104012951/http://www.google.com/onlinechallenge/files/gomc_guidelines.pdf

Google b, (2013). 2012 Google Online Marketing Challenge Winners. Google. Retrieved from http://www.google.com/onlinechallenge/past/winners-2012.html

Hammond, J., Hicks, M., Kalman, R., & Miller, J. (2005). PAR for the Course: a Congruent Pedagogical Approach for a PAR Methods Class. Michigan Journal Of Community Service Learning, 12(1), 52-66. Retrieved from ERIC, EBSCOhost

Jansen, B., Hudson, K., Hunter, L., Liu, F., & Murphy, J. (2008). The Google Online Marketing Challenge: Classroom Learning With Real Clients, Real Money, and Real Advertising Campaigns, Journal of Interactive Advertising, 9(1), 49-55. Retrieved from http://jiad.org/article109

Kemmis, S., & McTaggart, R. (2007). Participatory Action Research: Communicative Action in the Public Sphere. N. Denzin and Y. Lincoln (Eds.) Handbook of Qualitative Research. pp. 271-330. Thousand Oaks, Calif: Sage Publications.

Kindon, S., & Elwood, S. (2009). Introduction: More than Methods-Reflections on Participatory Action Research in Geographic Teaching, Learning and Research. Journal of Geography in Higher Education, 33(1), 19-32 Retrieved from ERIC, EBSCOhost

Krogh, L. (2001). Action Research as Action Learning as Action Research as Action Learning at Multiple Levels in Adult Education. Retrieved from ERIC, EBSCOhost

Lachapelle, P. (2011). The Future of Social Media for Community Developers. CD Practice, 17. Retrieved from http://www.comm-dev.org/attachments/070_CD%20Practice%202011n1%20Revised%20A.pdf

Lavin, M. (2010). The Google Online Marketing Challenge: An Opportunity to Assess Experiential Learning. ABD Journal, 2. Retrieved from http://www.abdjournal.org/Vol2/V2LavinP29-P39.pdf

Moon, J. (2004). A handbook of reflective and experiential learning: Theory and practice. RoutledgeFalmer.

North Georgia College & State University, (2012). Helium Stick. Retrieved from http://www.northgeorgia.edu/Leadership/Default_1col.aspx?id=1566#helium

Ozanne, J., & Saatcioglu, B. (2008). Participatory Action Research. Journal of Consumer Research, Inc., 35,423-439. Retrieved from http://www.marketing.pamplin.vt.edu/facultyFolder/julieOzanne/01socialwebsite/professional/researchpapers/2008_JCR_Participatory%20Action%20Research.pdf

Quixley, S. (2008). Participatory Action Research: An Outline of the Concept. Retrieved from http://www.suziqconsulting.com.au/free_articles_files/CD%20-%20PAR%20Detailed%20Overview%20-%20Aug08.pdf

Savin-Baden, M., & Wimpenny, K. (2007). Exploring and Implementing Participatory Action Research. Journal of Geography in Higher Education. 31(2),19-27. Retrieved from ERIC, EBSCOhost

Schwartz, J. (2011). Announcing the Winners of The Google Online Marketing Challenge. Google for Nonprofits Blog. Retrieved from http://googlefornonprofits.blogspot.com/2011/08/announcing-winners-of-google-online.html

Treiblmaier, H., Neal, L., & Murphy, J. (2009). Action Learning of Online Marketing via a Global Contest. Central Asia Business Journal, 2, 47-50. Retrieved from http://www.google.com/onlinechallenge/research_full.html

Vonderembse, M. A., & White, G.P. (2004). Core Concepts of Operations Management. Hoboken: John Wiley & Sons.

Montessori Approach in Pre-School Education and Its Effects

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ABSTRACT

The aim of this study is to evaluate the efficacy of Montessori Method on pre-school children. The effect of the worldwide Montessori Approach, that is amongst many contemporary education methods, is studied at an institution in TRNC. The effect of this approach on social, cognitive and physical development of the children has been evaluated. The primary aim of Montessori approach is to enable the child explore him/herself and free that personality; thus, a convenient environment has to be set for the development of the child. How parents, teachers and pre-school institutions set such environments is also studied within this research. Additionally, the effect of the Montessori approach on children that is used by the teachers at school is also observed. The study, firstly, defines the following at the pre-school institution within the Montessori approach and then evaluates the effect of them on the children: • Which principles are used• The role of the teacher• Tools used at school• The benefits The theoretical framework of this approach is drawn at an pre-school institution where this approach is implemented in TRNC.

Keywords: *Montessori education, pre-school education, principles of Montessori education*

INTRODUCTION

The importance of pre-school education is gradually increasing in the world and in our country. Which conditions should be implemented during the education of 0-5 years old phase, as it is considered to be the foundation of an individual's development? What would be the most beneficial way for this education to reach the intended aims? Pre-school is an important phase that prepares the child for primary school. We can help the children develop their senses and learn through experience by introducing the modern pre-school teachers to a child-centred education environment as well as child-centred educational tools and equipment. The pre-school institutions in Turkish Republic of Northern Cyprus are run by the state or private sector. The pre-school education system within the state and the private sector works in different systems. As it is not possible to provide education for all preschool children by the government within TRNC, the number of paid private institutions is increasing day-by-day. The opening of such institutions is still discussed not only in terms of meeting the educational needs but also in terms of the quality and quantity of the education provided.

Pre-schools education includes the process where the educational environments are set based on the needs of the children's ages in terms of building, tools and equipment, location, teacher, education system and education programs.

As the modern education systems are rapidly changing, child-centred educational applications are being defended within the children's rights as well. Modern approaches are child-centred (Goffin, 1994) and efficient learning method is used. Efficient learning method gives children the freedom of making their own choice. Children learn about the environment is a control-free way. They decide what to do, how to do it, and which tools and materials to use. This method enables children to develop their problem solving skills, creativity and communicative skills. (Temel, 1994) A child's awareness of himself and his world can only occur when the people who have efficient roles in the child's life and

the stimulants are set based on the child's needs and their differences. This approach has introduced us to the Maria Montessori theory.

Montessori Method is based on the child's desire to learn. It helps to child to implement on his own and learn in the best and easiest way possible (Akt.Kayılı ve vd, Oğuz ve Köksal Akyol ,2006). Pre-school phase is mostly considered to be a transition stage by the adults.

The SOS Pre-school and Nursery that was opened under SOS Children's Village name that took over the care and education of children who need protection in 1993, is also providing pre-school education since 1994.

The aim is to provide pre-school education for children under the association's responsibility and who live in the neighbourhood as well as for children who are not able to get education due to socio-economic factors in the society.

SOS Pre-School and Nursery is providing pre-school education for children between 15-60 months based on the principles of scientists like Maria Montessori and Frederich Frobel. While Maria Montessori supports the development of the child individually; Frobel supports the development of the child within a social group. Individual development of children is supported by considering the developmental differences between them that increase as they try to adapt to social life. Many studies observed that the Maria Montessori education program and the techniques and materials developed by it are convenient for this objective. These studies are administered with support from the parents and they raise the child to the anticipated levels.

Maria Montesori Education Theory

Maria Montessori, (1870 – 1952) is a scientist who earned the first female physician title in Italy. She was interested in the work of French Psychiatrist E. Donad Seguin who developed special materials for children with cognitive handicaps when she was studying at the University of Rome. She started educating children with cognitive handicaps in Rome after being inspired by Seguin's work. After observing the success of the method and the development of the children with special needs; she intended to work with normal kids using the same method. She had the chance to observe the efficacy of this method by opening classes for children between the ages of 2 and 6 in a poor neighbourhood of Rome in 1907. She called this educational environment the "Children's House" (Casa dei Bambini) (Aytaç.1981)

Montessori defends the idea that children should be enabled to learn on their own in a set environment where they choose their own materials. A pre-school environment set based on this principle includes Montessori materials on shelves to which pre-school children can reach. The learning environment is set by the teacher after objectively only by organizing the materials from simple to complex. Teachers should be good observers and only intervene when the child requires guidance.

According to Montessori, children to understand the order, harmony and beauty of the nature and they should be please with it. The rules of the nature form the basis of science and art fields. That is why; learning the rules of the nature is the foundation of science. (Montessori, 1966)

In this approach, it is crucial that the child makes mistakes by searching and trying and then, realized his own mistake and corrects it himself. If the child is not able to realize his mistake, this shows that he is not developed enough. When the time comes, the child realized his mistake and corrects it. (Temel, 1994)

The setting of the enviorenment is important in the Montessori approach. The relationship in such an environment is not between the child and the teacher; but it is between the child and the material. The teacher only guides the correct use of the material. (Dreyer ve Rigler.1969)

It is possible to gather children between 2-6 age groups in the same environment; the children are allowed to choose the material appropriate for their age from the same environment. They do not need to play with the same material. In such an environment the younger children develop themselves by taking the older ones as models; and the older children develop the behaviour of helping the younger ones. (Onur, 1995)

Main Principles of the Montessori Approach

The principles applied in Montessori education can be listed as follows:

There are three main factors of this education: environment, child and teacher Malloy (1989).

There are 8 main principles of the Montessori Education (Wilbrandt (2011:35),

1. Movement and cognition are closely related. Movement increases thinking and learning.
2. Learning and well-being are improved when people have a sense of control over their lives.

3. People learn better when they are interested in what they are leaning.
4. Tying extrinsic rewards to an activity, like money for reading or high grades for tests, negatively impacts motivation to engage in that activity when the reward is withdrawn
5. Collaborative arrangements can be very conducive to learning.
6. Learning situated in meaningful contexts is often deeper and richer than learning in abstract contexts.
7. Particular forms of adult interaction are associated with more optimal child outcomes.
8. Order in the environment is beneficial to children.

Table 1: Developmental Phases Of A Child According To Montessori

(Wilbrandt,2011:52)

Phases	Age	Characteristics
First Phase	0-3 years	The child constructs himself through instinctive development and 'internalization'.
First Phase	3-6 years	The child gradually moves from unconscious knowledge to conscious knowledge.
Second Phase	6-12 years	The child is ready to get information about the universe. At this stage, the child shows efforts to satisfy his intellectual needs.
Third Phase	12-18 years	The child is a humanistic explorer. He tries to understand his role in the society and how he can help to that role. At this stage, the children re-adapt themselves as social creatures, rational researcher of justice and problem solvers. This phase lasts for a lifetime.

How does Montessori Approach work?

Montessori Approach serves 3 main objectives. These are motor education, affective education and language education.

1. **Motor Education**: This education starts with daily practical skills like dressing, bathing, carrying stuff, sweeping outside, taking care of plants or pets. Montessori states that flawless movements should be repeatedly observed; that the child should be taught what to do not verbally but only by demonstration. Gymnastics and rhythmic exercises are importat as well as physical coordination and balance development in motor education. Montessori believes that activities required for motor education provide self-discipline, attention and good working habits. It emphasizes that these are important to develop senses and movement skills of the child for future academic learning.

2. **Affective Education:** Montessori prepared the learning toy materials for the development of senses. Doing coordinated exercises with these materials enables the child to make comparisons between materials. This enables learning through questions the similarities-differences between materials in terms on unquantifiable concepts like; shapes, colours, opposites, softness; length. The child becomes the observer. This eventually enables the child to make comparisons, make judgments and finally make a decision.

3. **Language Education:** Montessori emphasizes that the child has to realize all kinds of sounds around him and question the meanings of the sounds and thus learn the relationship between the different sounds. It is stated that this prepared the child to produce the correct sounds in the language. It is crucial that the teacher speaks clearly. It requires teaching the most commonly used tools by the students. After all the research and observation, the children will be like scienctist who explore. The aim is to develop lanuage by research and not through conversation.

4. **Literacy and Calculation**: It states that after the age of 4, children start to work on developing motor and sensual skills and prepare for academic life. Activities appropriate for literacy should also be included in that process. Arithmetic education should be prepared to help children learn abour compare-contrast and numbers.

Respect for the Child: Montessori principles pay great attention to the respect shown for the child. As every child is single, the education has to be individualized for each child. Children's lives should be kept apart from adults' and should be dealt differently. (Morrison, 1988).

Absorbent Mind: According to Montessori, the individual has to be educated by himself and not by someone else. Adults use their minds to learn; and children use their senses to absorb and learn affectively. During this absorment mind process, there are unconscious and conscious steps. Unconscious absorbent mind is usually between the ages 2-5 and it is enabled through tasting, smelling and touching. Between the age 3-6, the child seperates his affectionate observations from the environment and develops conscious absorbent mind senses. The child learns differentiating and matching. (Morrison, 1988).

Sensitive Periods: Montessori states that there are sensitive periods during which the child gains some skills and the teachers should be aware of these periods. The efficient education method during the sensitive periods optimizes the learning. Efficient education is related to setting the best environment.

These periods are divided into 5;

1. The period when the needed environment is set for the child
2. The period when the environment is explored through mouth and touching and language learning
3. Walking period
4. Curiosity, interest and adorement toward objects period
5. The interest to the social aspects of life period.

The importance of set environment

Learning takes place in a well-set environment. This aims to enable the child to be independent. After the teacher provides information, the child is free to choose the work, the materials on his own and produce on his own. This will result in learning independently.

Authenticity and **naturality** plays crucial roles in the Montessori approach. In a set environment, natural and functional tools should be used as much as possible. (Iron: heat, knife: cutting, glass: feeling, etc.) (Temel,1994)

The second important factor is the order of the set environment. The child will complete the task with the materials he has chosen; no one will intervene; after the task is complete the materials will be put back into their places according to class order; the child will contribute to the order of the environment he is living in. This will develop responsibility and self-discipline. The materials in the classroom have to be natural and authentic.

The peaceful environments will develop the child's personal discipline. (Calvert, 1986)

Pre-School Materials in the Montessori Approach

The rules for using the material are shown to the child. At the end of each activity, the child puts the materials back into their places. This behaviour becomes habitual after repeating it constantly.

Some materials are worked with on a special carpet. It is the child's responsibility to carry these materials to the carpet and back to their shelves after the activity. The child is guided towards that behaviour.

The child actively learnes as he uses these materials. Prepared information is not permanent and efficient in a child's mind.

Materials are meaningful for the child and they have 5 main factors:

1. The challenge or the mistake the child experience through exploring should be a part of the material.
2. The shape and usage of the materials should be ordered from simple to complex.
3. Materials should prepare the child for the next learning.
4. Materials provide not the concrete shape of an idea but its abstract form.
5. Montessori materials are prepared for the child's individual learning.

Role of the teacher in Montessori Approach

The role of the teacher in Montessori approach is to change and organize the environment according to the child's needs and in a way that will help the child to develop. The materials should be ordered from simple ro complex by the teacher as well. Montessori teacher is called guide/router. The teacher gives the child a chance to use his/her potential. (Linard,1972)

The teacher has to set an example with the outlook, appearance and personality for the children; the teacher has to give a sense of respect. Teacher is required to be flexible, humanist, affectionate, patient and understanding. (Temel, 1994)

Montessori teacher makes a lot of time for family and social life. Teacher organized the environment in a way that the child will be free to move, communicate and share with his friends.

Studies done on Montessori Education:

In his study, Tzuo (2007) believed that children are enabled to make free choices by using the Montessori materials; that children have the power to learn on their own; and that Montessori education is a factor that complements the role of the teacher.

McCarty (2007) stated that instead of homework, children were inspired by Montessori education and they become more creative at their life outside school.

Both disabled and non-disabled children took part in Eratay's study (2011). Both groups showed developmental improvements and this proved that the program has individual features and meets the needs arising from individual differences.

THE AIM OF THE STUDY:

The aim of this study is to evaluate the efficacy of Montessori Method on pre-school children. The effect of the worldwide Montessori Approach, that is amongst many contemporary education methods, is studied at an institution in TRNC.

Significance of the study:

This study is the first in TRNC to investigate the effects of the Montessori approach on pre-school children in terms of creativity, self-care, problem solving and social skills. Thus, the study was carried out at SOS Pre-school as it is the first school to implement the Montessori Method in TRNC.

Working group:

A study group was chosen to carry out this research in order to investigate the relationship between the development of pre-school children and the Montessori education method. The study group included: 9 pre-school teachers who worked at SOS in 2012-2013 and 10 parents. The features of the 9 pre-school teachers are: %55of the teachers were between 22-24 years of age, 45% was between 36-44 years of age; 55% had 5 years or less professional experience while 45% had professional experience between 6-20 years. 44% of the teachers had graduate education, 45% are graduates from vocational child development schools and 11% are still pursuing on-going graduate degrees. 44% of the teachers had Montessori Training that lasted for 1.5 years.

The Problem of The Study

What is the level of using Maria Montessori approach among 4-5 age groups at SOS in TRNC? The following sub-problems will be tried to answer in order to come up with an answer to the main research question:

1) What is level of family participation within the Montessori approach at SOS?
2) What is level of creativity of students who get Montessori education at SOS?

3) What is students' self-care level who gets Montessori education at SOS?
4) What is the level of students' problem solving skills that get Montessori education at SOS?
5) What is level of social skills of the students who get Montessori education at SOS?

METHOD

The data collected in this study have been gathered by the researchers qualitatively in the form of observations and interviews. The qualitative interview questions ask the participants their perceptions, feelings, beliefs, intentions and experiences on the subject of the study.

Data Analyses:

The findings from the interview forms were analysed using the content analysis method. The data collected from the interview questions that were interpreted through content analysis, have been analysed using the percentages and frequencies from the descriptive statistics.

Content Analyses:

It is defined as the process of summarizing and specifying the main content of the documents and the message they include (Cohen ,Manion and Marrison(2007)).

It is aimed to define the data and bring out the hidden truth of the data thorugh content analysis. (Gülbahar and Alper 2009). Four steps were followed in order to process the qualitative data through conten analysis:

Coding the data,
Finding the themes,
Organizing the codes and the themes,
Defining and interpreting the findings (Yıldırım&Şimşek (2006)).

DATA COLLECTION INSTRUMENT:

Data was collected through observation, interview and document review in this study. Interview is to state perceptions, perspectives, experiences, and emotions and unter into an individual's inner world and understand his/her perspective. We try to understand concepts that cannot be observed such as attitudes, thoughts, intentions, comments, perceptions and repsonses through interviews. The main duty of the interviewer is to enable the interviewee to give sincere responses. Written documents were used to collect data.

Standardized open ended interview method was used to collect the data. Interview questions were carefully written and they followed a certain order. Questions were asked in the same order and same style to all individuals. Flexibility was limited. Interviewer reduced subjectivity. 2 experts were consulted while preparing the interview questions. Validity of the questions was assembled by carrying out a pilot study. Several factors were considere when preparing the interview questions: writing questions that are easy to understand, asking questions that are focused, asking open-ended questions, avoiding manipulation, avoid asking multi-dimensional questions, preparing alternative and trigger questions, asking different kinds of questions, and organizing questions in a logical way. (Yıldırım &Şimşek)

PERIOD OF THE STUDY:

The study was carried from September until the end of November of the 2012-2013 Academic Year at the SOS Pre-school. During this period, teachers and parents have been interviewed about the educational period that was planned based on the Montessori Method.

Study pattern:

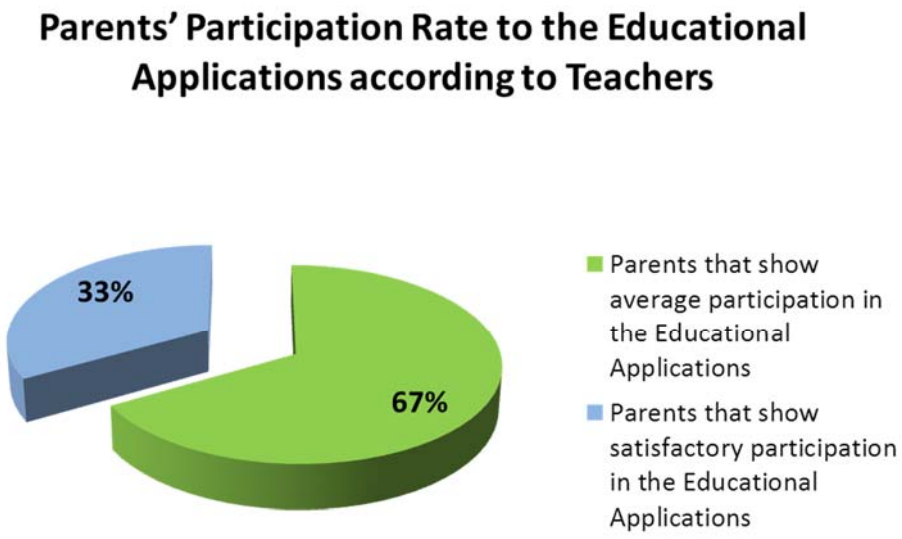
The pattern of the study is the « phenomenologic» pattern. This pattern focuses on the phenomena that we are aware of but do not have a deep and detailed understanding. (Yıldırım &Şimşek(2011:74)

FINDINGS

Findings and Interpretation about the First Sub-problem

Findings about the first sub-problem

The first sub-problem of the research has been defined as: "What is the level of family participation within Montessori approach at SOS?" The findings gathered from the interviews with the teachers related to this first sub-problem are as follows:



As you can see from Graphic 1, teachers who work in Montessori class stated the participation rate of the parents as 66.7% "average" and as 33.3% "satisfactory". They also added that all parents ask about what their children do at school.

Additionally, the following views of the teachers who participated parallel in this study are also important:

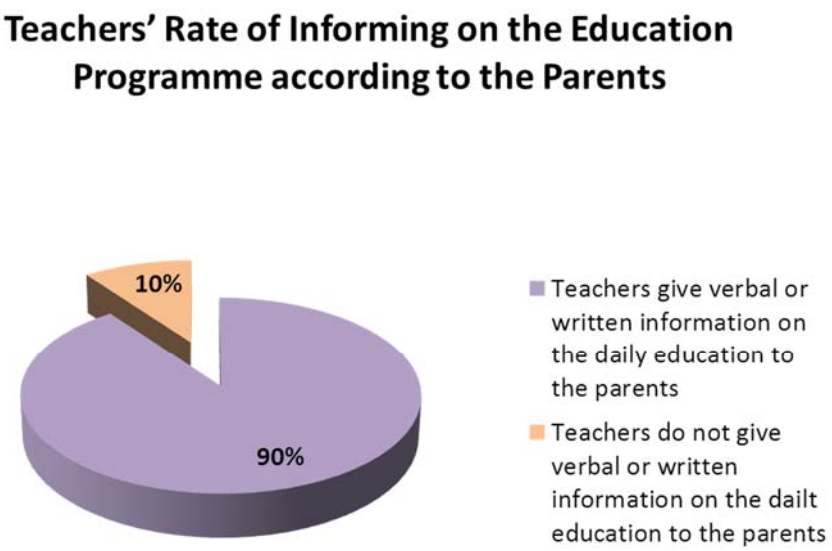
" ….the parents of our children usually ask about what their children do at school. They also participate in the school acitivities whenever they have a chance....") (t1)

" …parents ask what their children do during the day at school or if they eaten their meal or not…" (t2)

"… parents want to get detailed information on what their children do at school. They usually get more information on self-care, adapting to school, their emotional state rather than the activities at school…"(t4)

90% of the parents believe that teachers give information on daily activities either verbally or written. Besides,

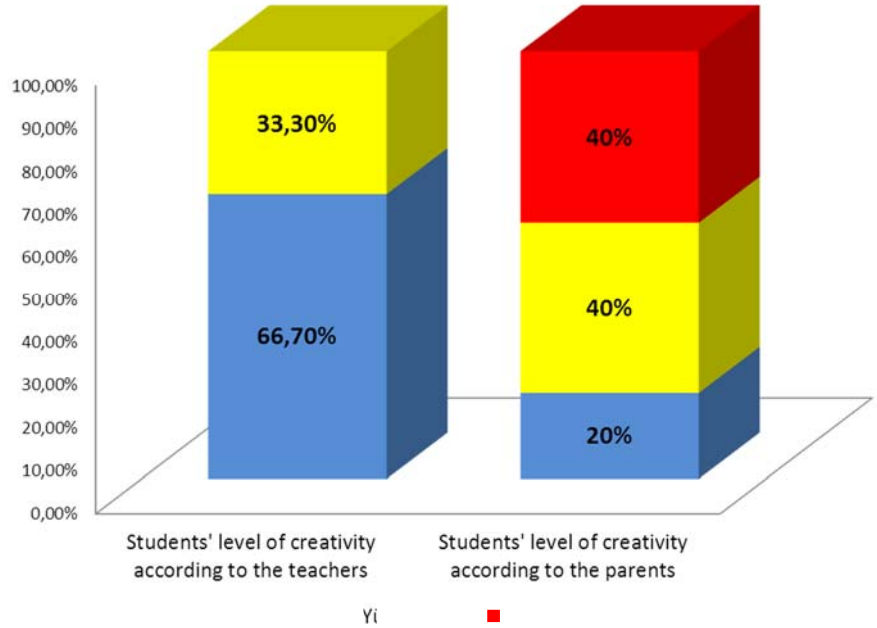
100% of the parents believe that the education helps their children to develop.



In conclusion, these finsings show that parents are closely interested in their children's lives; they try to learn what their children do at school and try to participate in the activities.

Findings and Interpretation on the Second sub-problem

The secons sub-problem of the study was: "what is the creativity level of the students who get Montessori education at SOS?" The findings gathered from the interviews with the teachers related to this first sub-problem are as follows:



The teachers of the Montessori class stated the students' creativity level as 66.7% "high" and 33.3% as "average".

Additionally, the following views of the teachers who participated parallel in this study are also important:

"….at young ages, especially creative thinking, dreaming, forming stories are emphasized. When we talk with the children without limiting them and only by stimulating their instinct, great ideas come out…" (t4)

" ….saying that a simple line looks like a horse, tree, etc. in a free drawing activity..."(t2)

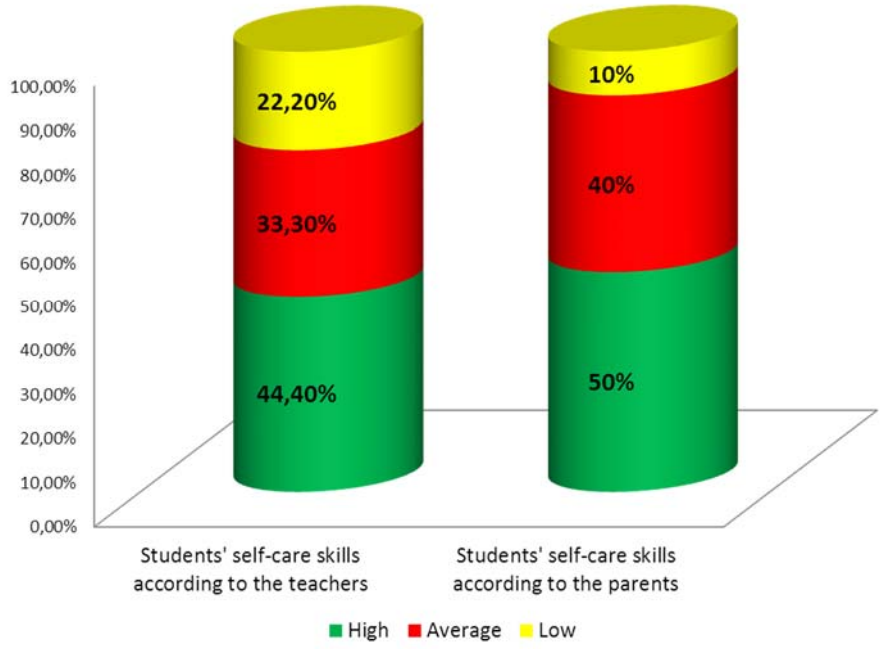
"…all activities are planned according to the children's performance…" (t8)

Parents see their children's creativity as: 40% low; 40% average and 20% as high.

In light of these findings it can be said that students to get Montessori education at SOS have a high level of creativity.

Findings and Interpretation on the third sub-problem

The third sub-problem is: "what is the level of self-care of the students to get Montessori education at SOS?" The findings gathered from the interviews with the teachers related to this first sub-problem are as follows:



Teachers who participated in this study stated the level of self-care of their students as: 44.4% high; 33.3% average; and 22.2% low.

Additionally, the following views of the teachers who participated parallel in this study are also important:

"..the use of toilet and lavatory on their own changes depending on the month and age. Chilren pay attention to the cleanliness of their clothes and belongings…."(t5)

"I don't believe that they gain independence as it is not possible to do personal cleaning and care without help due to age reasons..."(t4)

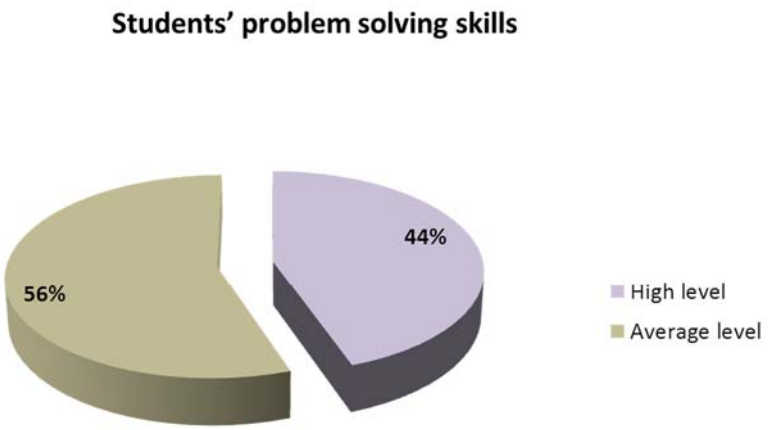
"…our students ae able to use the toilets and lavatory on their own. Most of them pay attention to the cleanliness of their clothes, belongings and their bodies. They are very close to being independent in terms of self-care skills…."(t1)

The parents defined their children's self-care skills as: 10% low; 40% average; and 50% high. The views of the teachers and the parents are close and they mostly show consistency.

To conclude, it can be said that most of the students show satisfactory self-care skills.

Findings and Interpretation on the fourth sub-problem

The fourth sub-problem is: "What is the level of problem-solving skills of the students who get Montessori education at SOS?" The findings gathered from the interviews with the teachers related to this first sub-problem are as follows:



Teachers stated that 44.4% of the children have high problem solving skills and 55.5% show average problem solving skills. Additionally, the following views of the teachers who participated parallel in this study are also important:

"…students sometimes ask for help. For example, when they are making a puzzle or putting in pieces together they try by rotating the piece. In such a case, the student tries to find the solution himself. If the puzzle pieces are complex, they ask for the help of the teacher and they do the first round together. When they do the same puzzle for the second time, they do not ask for help…"(t2)

"…they call out to the teacher and ask for help by saying that they can't do it…"(t5)

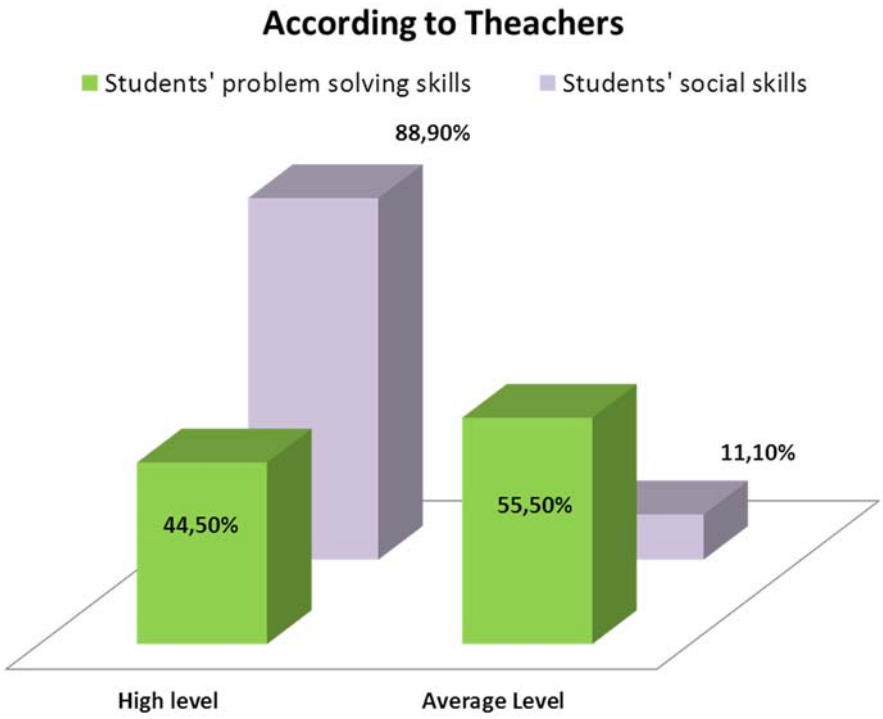
"…when there is a conflict between the student about sharing a toy, they first ask for the help of the teacher. Then, they realize they can solve the problem on their own with the guided questions of the teacher. This way, children become capable of solving their problem without asking for help in future…"(t4)

Parents' views on their children's problem solving skills are as follows: 10% show low level; 70% show average level; and 20% show high level of problem solving skills. The difference between the views of the teachers and the parents is due to the varying level of problem solving skills shown by the student at school among his peers and at home with his parents. It is suggested to strengthen the communication between the school and the parent collaboration.

In conclusion, students get help from their teachers when they are gaining the problem solving skills. They realize how they can solve the problem with the guidance of their teacher.

Findings and Interpretation on the fifth sub-problem

The fifth sub-problem of the study is: "What is level of social skills decelopment of the children who get Montessori education at SOS?" The findings gathered from the interviews with the teachers related to this first sub-problem are as follows:



88.9% of the teachers stated their students' social skills as 'high' while; 11.1% of the teachers said that social skills of the students were 'average'.

"…when children first start school, they observe their friends and teachers. Trust is formed at the end of the observations…" (t2)

"…children who can express themselves verbally are able to communicate, tell their problems easily to their teachers or friends…"(t4)

"… teachers have strong dialogues with their friends. Their relationship with the teacher is like mother-child. They can easily form dialogues with the other party; start and maintain a communication. They can also start conversations easily with the interns coming to school…"(t3)

"…students play lego, ball or family games with their friends…they can communicate verbally and physically…"(t5)

Parents' view on the social skills are as follows: 10% of the parents say it is 'low'; 30% of them say it is 'average' and 60% of them said it is high. The difference between the views of the teachers and the parents is due the the high level of social skills shown by the students among their peers at school. They show lower social skills with parents or outside school. To conclude, it can be interpreted that students' have high social skills.

RESULTS:

1. Family participation rate is pleasing within the Montessori approach at SOS. The reason for this is that families are able to get information on school system and the education system as well as getting a chance to communicate with the teachers as they drop or pick their children from school.
2. It is possible to say that the creativity of the children at SOS, who get the Montessori education, is at a satisfactory level based on their age and developmental features.
3. The main problem of this study is taken as the Maria Montessori approach brings out the children's creativity. Based on this, it can be said that there is a relationship between this approach and learner-centred education.
4. It can be stated that the self-care skills of the children at SOS who get Montessori education are mostly satisfactory. This can be interpreted as the school and the parents provide necessary opportunities for the children to develop their self-care skills.
5. The problem solving skills of the children at SOS, who get the Montessori education, are at satisfactory level.
6. In the light of these findings, it can be said that the following are all important factors: the child expressing him/herself; being listened to by an adult; and giving the chance to make his/her own decisions.
7. It is possible to observe that the social skills of the children at SOS, who get the Montessori education, are at high levels. This can be related to the implementation of group work as well as collaborative applications.

Suggestions:

1. New curricular programs can be prepared for other pre-school institutions in Northern Cyprus based on the Montessori Method.
2. We suggest communal support for institutions like SOS that use this approach at high levels.
3. Pre-school teachers can be trained on Montessori Method by organizing seminars.
4. The effect of Montessori education on other development fields of children can be evaluated.

REFERENCES:

Aytaç.K (1981) Contemporary Educational Movements Ankara: University of Ankara Faculty of Langauge, History and Geography Publications: 265.

Calvert, P (1986) Responces to Guidelines for Developmentally Appropriate Practise for Young Children And Montessori ERİC Ed 280558

Çağlar,D.(1979).Education of Mentally Retarded,(2nd Ed.).Ankara: University of Ankara, Favulty of Education Publications .No:82.106-108.

Dreyer, A. S. ve D. Rigler, Congnitive Performance in Montessori and Nursery School Children, Journal of Educational Research.62:9, 411 – 416.

Eratay ,E.(2011). The Efficacy of the Montessori Method, Journal of Pegem and Education 1,11-19. Goffin. G:S (1994) Curriculum Models and Early Chilhood Education, Macmillan Collage Puplishing Company, New York

Koçyiğit, S., Kayılı, G. ve Erbay, F. (2010). İnvestigating the Effect of Montessori Method on the Receptive Language Skills on 5-6 year olds, Journal of Turkic Studies.

Lillard, P.P (1972) Montessori Modern Approach. Shocken Books New York.

Mallory, T.(1989).Montessori and Your Child: Parents' Guidebook. Trans: Füsun and Cihan Gülten). Hatiboğlu Publishing, p.88,Ankara.

Montessori, M. (1966) The Montessori Method İnteroduction by J. Mc. V Hunt. Seventh Printing. New York. Schocken Books

Morrison, G. S. (1988) Early Chilhood Education Today, Melbourne: Merril Puplishing Company,

Onur, B (1995) Child and Teenage Development. 2nd Ed. Ankara: İmge Bookstore

Temel. Z,F.(1994) "Montessori views and Educational Approach" Journal of Pre-school Education, 26(47), 18-22.

Wilbrandt,E.(2011). Montessori Approach in Pre-school Education. Kök Publishing. Ankara.

The Scale of Preservice Teachers' Digital Pedagogic Competencies: Validity and Reliability Study

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ABSTRACT

Educators increasingly show interest to digital media that contains different learning styles and affects social and cultural aspects of children and young people. In our country, the relationship betweeen technology, pedagogy and teacher has gained importance within the scope of "The Movement of Increasing Opportunity in Education and Improving Technology" (FATIH in Turkish) project of Ministry of National Education, which newly comes to the fore, related to active implementation of digital technologies in education. The education to be given within the scope of the project has been called digital pedagogy by researchers as it comprehends both digital information and pedagogy. The objective of the study is to develop a valid and reliable measuring tool in order to measure the competency of teacher candidates to use and create digital devices. When the measureing tool was developed, the courses to be given to teachers during the development of the measuring tool and the cases including digital pedagogy in literature were taken into consideration. Firstly, exploratory factor analysis was conducted for DPCS and a three factor structure that revealed % 55.6 of total variance was obtained. The structure acquired was tested with the exploratory factor analysis and model fit was tested through confirmatory factor analysis. As a result of the exploratory and confirmatory factor analyses, it was found that the model, which consisted of 19 items and three factors, was appropriate theoretically and statistically.

Keywords: *Teachers, Preservice Teachers, Digital Pedagogy, Competency*

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INTRODUCTION

Communication and information technologies have increasingly become a part of our daily lives (Bayhan, Olgun & Yelland, 2002). Individuals use digital technologies as a device to create and spread entertainment, research and artistic studies; to establish a relationship with the world and each other through more different ways than previous generations did. (Wagner, 2008). The technologies used in education are divided into two groups as standard (board, chalk etc.) and digital (smart board, the internet, computer etc.) (Koehler, Mishra & Yahya, 2007). The standard technologies have been highly used in eduction for a long time and a sufficient education related to these devices has been given to teachers. However, the use of digital technologies in education has not the desired level; in new millennium, traditional teaching methods fall behind to meet the interests and needs of students of the age, new approaches have replaced the traditional views that suggest the impossibility of integration of pedagogy and technology (Barab, King & Gray, 2004; Roblyer & Edwards, 2000).

Educators increasingly show interest to digital media that contains different learning styles and affects social and cultural aspects of children and young people. The activation of this interest in educational process is enabled not only by including newly developing abilities of digital world in the programme, but also by stating how and in what way these abilities are connected. The dimension containing the questions of "how" and "in what way" is the dimension of "digital pedagogy." If the technology at hand has stages of development, it should be discussed how it must be in the learning

dimension (Willett, 2007). This is related to the creation of new pedagogic fields in educational programmes, and of educational environments for the growth of a generation that will keep up with the developing technology. Along with these developments, today curriculums have been integrated with technological advances (Digital literacy, e-abilities, screen reading etc.).

Technological changes affect class climate, the methods and tecniques used in teaching as well as giving some responsibilities to teacher and student. This requires a connection between pedagogy and technology. While the target of models which are result-oriented, is to make teachers obtain information and abilities concrning the use of technology, the objective of the model, that are pedagogy-oriented, is to make teachers associate their technological information with pedagogic information (Yurdakul, 2011). Individuals should balance technical and personal elements by taking digital pedagogics into consideration in the process that they try to reach their learning targets. The case is the same for teachers and teacher candidates. The elements of developing digital pedagogy should be dealt for teacher candidates in the process that they begin teachership, and it should be begun to teaching process (Lloyd & Irvine, 2005). Since teachers determine that students coming to school, whether use educational technologies in a correct and relevant way or not, teachers should have information in that field.

The changes experienced in education applications lead to make changes in competencies that teachers are required to have. Various projects, related to the active actualization of digital technologies in education, have been carried out in our country. The most recent one of these is the project, called the Movement of Increasing Opportunity in Education and Improving Technology briefly known as FATIH in Turkish, conducted by Ministry of National Education and Ministry of Transport in a cooperation. Through FATIH project (2011-2014), which is claimed to contain reformatory changes for Turkish Education System, computer for every school in the first transformation, the active use of information technologies in the second transformation and tablet for every student in the next transformation have been aimed. Within the scope of the project planned to be completed in three years, it is stated that computers connected to the internet, smart board and delineascope are to be placed in classes. (Kayaduman, Sırakaya & Seferoglu, 2011).

When we take a look at the regulations made within the scope of Fatih project, it is considered appropriate and necessary to give in service training in several cases from the education of teacher to physical conditions of school. The substructure of the equipment provided for the classes given within the scope of the project, educational e-contents, teacher's guidebooks and courses of basic computer use to be accorded to information technologies are basically main topics. As a result of the in service training given, teachers are expected to actively use the equipment to be provided within the scope of the project, to find and select e-content media which are suitable for the objectives of course, to prepare appropriate products for the objectives of course and to make BT supported course design by using the material he/she finds/prepares (http://fatihprojesi.meb.gov.tr/tr/icerikincele.php?id=12, 2012). The education to be given within the scope of the project has been called digital pedagogy by researchers as it contains both digital information and pedagogy. The digital pedagogy requires that teachers know basic information related to digital devices and use them actively in education process. Because to benefit from information technologies at maximum level in education in the digital age, depends upon the creation of innovative methods, the reforms to be made around the pedagogic learning should be in the direction to increase the interest and attendance of students (Salmon, 2002; Sandholtz, Ringstaff & Dawyer, 2002). The teachers to integrate teaching courses that will not be transformed by themselves into their courses, are necessary (Kumar, Rose & D'Silva, 2008). It is recommended that teacher education programme instructors be equipped with technological pedagogical skills which will enable them to competently integrate the new technologies in their teaching and learning (Condy, Chigona, Gachago and Ivala, 2012).

Prensky (2001) defines students as natives and teachers as immigrants of the digital world; emphasizes and supports that some changes should be made in the subjects discussed and pedagogic educations obtained by teachers in order to create an efficient interaction with students. At the same time a teacher, who has a good information of pedagogy, understands how students create information, how they obtain abilities and how they develop mental habits for learning (Mishra & Kohler, 2006).

The digital technologies have dramatically changed applications and practices in many fields (Barko, Whitcomb & Liston, 2009; Mishra & Koehler, 2006). When literature was reviewed, it was tried to determine the digital pedagogic competencies of teachers in order to specify the effects of these changes on teachers (Reinmann, Freebody, Hornibrook, Howard, 2009; Parigi & Rossi, 2011; Krumswik, 2006). It was seen in the studies that teachers did not regard themselves sufficient in digital terms (Isman, 2002; Bozkurt, Bindak & Demir, 2010). However some studies have been done about teacher candidates' perceptions, attitudes, and readiness. Aderson and Maninger (2007) evaluated preservice teachers' abilities, beliefs, and ıntentions regarding technology integration.

; Teo, Chai, Hung and Lee (2008) investigated preservice teachers beliefs about teaching and uses of technology

However Koç and Bakır (2010) investigated pre-services teachers'(elementary teachers, mathematics teachers, english teachers, science teachers, special education teachers) knowledge, experıences and perceptions about preparation to using educational Technologies. Furthermore Topkaya, (2010) investigated preservice englısh language teachers' perceptıons of computer self-effıcacy and general self-effıcacy and Adalıer (2012) analysed Turkish and English language preservice teachers' computer self-efficacy and attitudes toward computer.

However, needs analysis should be made to see at what level the competencies of teacher candidates, who are to be newly graduate, within the scope of digital pedagogy. Therefore, a measuring tool is required to determine the relevant cases. The objective of the study is to develop a valid and reliable measuring tool in order to measure the ability of teacher candidates, who study at faculty of education, to use and form digital devices. In accordance with this objective, a "Digital Pedagogic Competencies Scale" is to be developed, and the validity and reliability studies of the scale are to be conducted.

METHOD

The research is a study of scale development. The work group of the scale and improvement works are dealt in this chapter.

Work Group

In this study, it is aimed to develop a scale to measure digital pedagogic competencies of 246 teacher candidates, who study at Faculty of Education, Sakarya University and at Ataturk Faculty of Education, Marmara University in 2011-2012 school year, compose the work group. Some statistical processes were conducted on the data obtained from the work group and the scale was developed. The scale was applied to 246 people in total in the process of developing Digital Pedagogic Competencies Scale (DPCS).

Development of Scale

When DPCS was developed, firstly an item pool composed by making interviews with teacher candidates who form a target group for whom the scale was to be used, and observations as well as examining literature. There were 29 items in the item pool. 5 point likert type gradation was used to express agreement level related to the items in the scale. This gradation was created as "(*1) I certainly agree; (2) I do not agree; (3) I'm undecided; (4) I agree and (5) I completely agree*."

First of all, some specialists to be applied for comprehension and face validity were appointed in validity studies. The comprehension and face validity were presented to academicians who were specialists in Scale, Computer and Instructional Technology, Assessment and Evaluation and field of Turkish Language, and their opinions were received. In accordance with the opinions received and criticisms, the necessary corrections were made in the scale items, and a total 29 item scale was composed, and the validity and reliability studies were conducted over these items.

The exploratory factor analysis was applied to the data obtained from the scales at first. To determine the items to be found in the scale in the exploratory factor analysis, it was noted that eigenvalues of items were at least 1 (Shevlin ve Lewis, 1999), load points of items were.30 at minimum (Martin and Newel, 2004; Schriesheim and Eisenbach, 1995), the items should be in only one factor and there should be at least .10 variance between the factors found in two factors (Buyukozturk, 2007). Moreover, for one item dimensions that did not reveal %5 variance and the items having sufficient load in two dimension, the items without .10 factor load were reduced (Buyukozturk, 2007) and one factor items were excluded. Furthermore, basic components analysis and varimax rotation method were used in EFA (Exploratory Factor Analysis).

The model fit of item-factor structure obtained from EFA was tested with the confirmatory factor analysis (CFA). The multi fit indexes were used for CFA. For GFI, CFI, NFI, RFI, NNFI and IFI, >.90, (Hu and Bentler, 1999) and for RMSEA <.08 was taken as a measure (Cole, 1987) in fit indexes as in general. The internal consistency and split half reliability processes were made for the realiability of the scale. For the validity and reliability analyses, SPSS 11.5 and LISREL 8.54 (Jöreskog and Sorbom, 1996) programmes were used. The item analysis of DPYÖ was examined through the corrected item-total correlation.

FINDINGS AND INTERPRETATION

The exploratory and confirmatory factor analysis were made for the structure validity of DPCS. The internal consistency and split half reliability processes were made for the reliability.

Structure validity

Exploratory factor analysis

EFA was made to determine the factor structure of DPCS in this study. In order to test the fitness of data gathered from the sample to the factor analysis, KMO and Barlett tests were conducted. χ^2 value of KMO was found as .90 and Barlett test made for DPYÖ as 1911.78 ($p < .001$). That KMO is found as higher than .60 and Barlett test as meaningful, shows that the data are appropriate for the factor analysis (Buyukozturk, 2007).

As a result of EFA, a three factor structure that revealed % 55.6 of DPCS total variance was obtained. The first of these factors are 16., 21., 22., 23., 24., 25. and 26. items and it consists of 7 items in total. The load point of items in this factor vary between .43 and .84. This factor that revealed %21.33 of total variance in the scale, was expressed as "Educational Digital Pedagogic Competency" (EDPC). In the second factor found in the scale, there are 7 items in total including 2., 6., 8., 9., 11.,12. and 13. items. The load point of the items in this factor vary between .48 ile .76. This factor that revealed %19.02 of total variance in the scale was called "General Digital Pedagogic Competency" (GDPC). The third factor in the scale consists of 5 items in total including 1., 4., 10., 18. and 19. items. The load point of the items in this factor vary between .55 ile .78. This factor that revealed %14.80 of the total variance of the scale was named "Web Digital Pedagogic Competency" (WDPC). Both the total of the scale and the total points for each sub-dimension are obtained from DPCS. The total point increase acquired both for the whole scale and sub-dimensions, indicates that the digital pedagogic competency has risen. The factor points of scale items and the variances revelaed by sub-scales are given in Table 1.

Table 1.
Factor Loads of Digital Pedagogic Competency Scale Items and Variances Revealed by Subscales

Item Number	Educational Digital Pedagogic Competency	General Digital Pedagogic Competency	Web Digital Pedagogic Competency
16	.43		
21	.63		
22	.70		
23	.74		
24	.84		
25	.82		
26	.73		
2		.50	
6		.48	
8		.69	
9		.63	
11		.69	
12		.76	
13		.66	
1			.58
4			.58
10			.55
18			.78
19			.70
Total variance % 55.15	**%21.33**	**%19.02**	**%14.81**

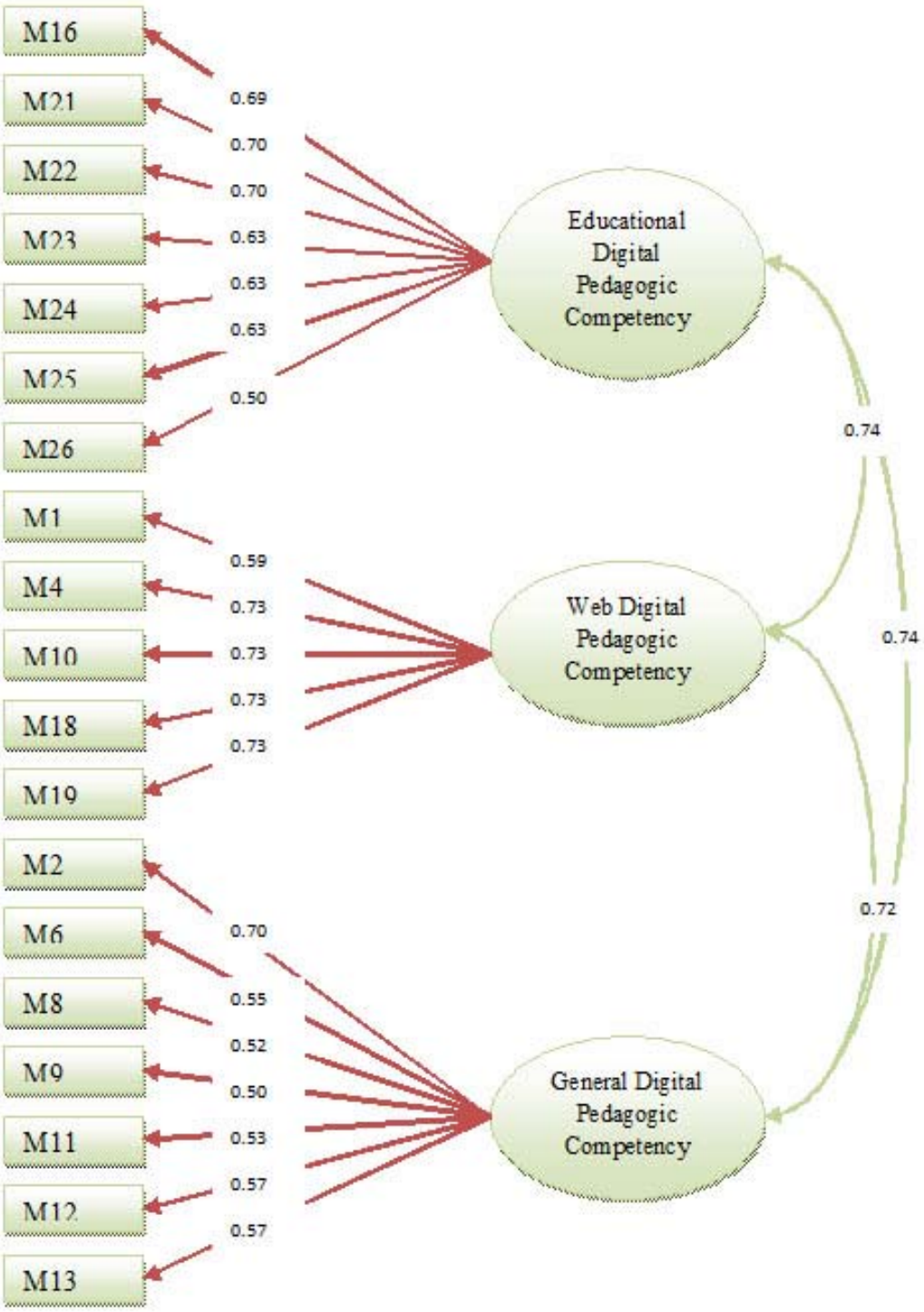
Confirmatory Factor Analysis

It was tested by DPCS confirmatory factor analysis consisting of 19 items and three sub-factors.

Confirmatory Factor Analysis for Digital Pedagogic Competency Scale

Fit indexes of the model obtained were examined in DFA made and it was seen that the value of chi-square (X^2=278.00, sd=200, p= .00) was meaningful. The values of fit index were found as RMSEA= .062, NFI= .95, CFI= .98, IFI=.98, RFI= .94, GFI= .89 and NNFI=.97. Moreover, it was regarded as suitable to make a modification between 5- 4., 7.-2., 9.-8., 11.-10. and 14.-13. items in accordance with the modification offers of confirmatory factor analysis. These values of fit index show that the model gives a good fit. The factor loads related to the three dimensional model are indicated in figure 1. As it is seen in figure 1, factor loads vary between .50 ile .70 for EDPC sub-dimension, .50 ile .70 for GDPC sub-dimension, and .59 ile .73 for WDPC sub-dimension.

Figure 1. DFA Results Related to Digital Pedagogic Competency



Reliability

The internal consistency and split half reliability methods were used to specify the reliability of DPCS.

Internal Consistency Coefficient for Digital Pedagogic Competency Scale

The internal consistency coefficient of DPCS was found as .91. The split half reliability of DPCS was determined as .88. The split half reliability was seen as .85 for EDPC and as .73 for GDPC and as .74 for WDPC. The reliability coefficients of DPCS calculated with the internal consistency and split half reliability method, are shown in Table 2.

Table 2. Reliability Co-efficients Calculated with Internal Consistency and Split Half Reliability Method Digital Pedagogic Competency Scale

Dimensions	Internal Consistency	Split Half Reliability
Educational Digital Pedagogic Competency	.89	.85
General Digital Pedagogic Competency	.81	.73
Web Digital Pedagogic Competency	.76	.74

Item Analysis

Item analysis was made to determine the selectivity power of DPCS. As a result of the analysis made, it was seen that corrected item-total correlations of DPCS were arranged between .46 ile .66. The findings are seen in Table 3.

Table 3. Corrected Item Test Correlations of Digital Pedagogic Competency Scale

	When Item is Absent, Scale Average	When Item Scale Variance	Item Total Correlation	When Item is Absent, Scale Alpha
m1	64,87	132,553	,517	,902
m2	65,62	128,685	,486	,903
m4	64,64	134,196	,499	,902
m6	65,41	131,020	,502	,902
m8	65,70	128,094	,525	,901
m9	66,08	131,025	,464	,903
m10	65,31	123,897	,618	,899
m11	65,65	122,191	,646	,898
m12	66,65	130,155	,481	,903
m13	66,64	126,870	,497	,903
m16	65,22	125,562	,639	,898
m18	64,77	131,976	,499	,902
m19	65,31	128,196	,581	,900
m21	65,54	129,327	,631	,899
m22	65,47	128,250	,649	,898
m23	64,91	131,462	,594	,900
m24	65,10	131,528	,580	,900
m25	65,00	131,114	,587	,900
m26	65,00	129,900	,614	,899

CONCLUSION AND DISCUSSION

The objective of the research is to develop DPCS in order to determine digital pedagogic competency of teacher candidates. Firstly, the exploratory factor analysis was made for DPYÖ and a three factor structure that revealed % 55.6 of total variance was obtained. When it is thought that %30 and above is taken as a measure for the variance rate explained in scale development and adaptation studies, it is seen that the structure validty of the scale is enabled. The highness of the variance explained can be interpreted as an indication that the relevant conception or structure is measured ever so well (Buyukozturk, 2007). The structure obtained was tested with the exploratory factor analysis and model fit was tested through confirmatory factor analysis. As a result of the exploratory and confirmatory factor analyses, it was found that the model, which consists of 19 items and three factors, was appropriate theoretically and statistically.

The lowest point to be obtained from DPCS is 19, and the highest one is 95. The increase in points shows that the digital pedagogic competency has risen in terms of teacher candidates. When we take a look at the distribution of the items in the scale according to the factors, it has been determined that 16., 21., 22., 23., 24., 25. and 26. items are EDPC; 2., 6., 8., 9., 11., 12. and 16. items are GDPC; 1., 4., 10., 18. and 19 items are WDPC.

The internal consistency and split half reliability methods were used to determine the reliability of DPCS. As a result of the analyses made, the internal consistency co-efficient of DPCS is 91, for EDPC, GDPC and WDPC sub-dimensions, these are respectively .89, .81 and .76. It has been determined that the split half point of DPCS is .88 for the total of the scale, is respectively .85, .73 and .74 for its sub-dimensions. The highness of internal consistency and split half reliability of DPCS shows that the reliability of the scale is good.

As a result of the item analysis, it has been seen that the item-total correlations of the scale vary between .46 and.66. Given the fact that .30 and higher items selects individuals very well in terms of the quality measured, is adopted in the interpretation of item-total correlation (Buyukozturk, 2007), it can be said that the scale is at the sufficient level in terms of item total correlation. In conclusion, DPCS developed within the scope of this research, emerges as a valid and reliable scale to be used to determine the digital pedagogic competency of teacher candidates. Moreover, to conduct various researches with “DPCS” will make important contributions to the measure power.

REFERENCES

Adalıer, A. (2012). Turkish and English Language Teacher Candidates’ Perceived Computer Self-Efficacy and Attitudes Toward Computer. *The Turkish Online Journal of Educational Technology, 11(1)*, 192-201.

Aderson, S. E., & Maninger, R.M. (2007). Preservice Teachers' Abilities, Beliefs, and Intentions Regarding Technology Integration. *Journal of Educational Computing Research, 37(2)*, 151-172.

Barab, S. King, R.& Gray, J. (eds.) (2004). *Designing for virtual communities in the service of learning*. Cambridge, England: Cambridge University Press.

Barko, H., Whitcomb, J. & Liston, D. (2009). Wicked problems and other thoughts on issues of technology and teacher learning. *Journal of Teacher Education, 60*(1), 3-7.

Bayhan, P., Olgun, P. & Yelland, N. (2002). A study of pre-school teachers’ thoughts about computer-assisted instruction. C*ontemporary Issues in Early Childhood, 3*(2), 298–303.

Bozkurt, A., Bindak, R. & Demir, S. (2010). Matematik öğretmenlerinin bilgisayarı etkin kullanma yeterlilikleri ve çalıştıkları ortamların uygunluğu, *Proceedings of 10th International Educational Technology Conference (IETC) 2010*, İstanbul, Türkiye, 930-934.

Büyüköztürk, Ş. (2007). Sosyal bilimler için veri analizi el kitabı. Ankara: Pegem Akademik Yayıncılık.

Cole, D.A. (1987). Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology, 55*, 1019-1031.

Condy, J., Chigona, A., Gachago, D. & Ivala, E. (2012). Pre-Service Students’ Perceptions and Experiences of Digital Storytelling in Diverse Classrooms. The Turkish Online Journal of Educational Technology, 11(3), 278-285.

Erçetin, Ş.Ş., Çetin, B. & Potas, N. (2007). Multi-dimensional organizational intelligence scala(muldimorins). *World Applied Sciences Journal, 2*(3), 151-157.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structural analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Informative Presentation of FATIH project (2012). Retrieved June 15, 2012, from http://fatihprojesi.meb.gov.tr/tr/icerikincele.php?id=12.

Işman, A. (2002). Sakarya İli Öğretmenlerinin Eğitim Teknolojileri Yönündeki Yeterlilikleri. *The Turkish Online Journal of Educational Technology – TOJET. 1(1),* 72-91.

Jöreskog, K.G., & Sorbom, D. (1996). LISREL 8 reference guide. Lincolnwood, IL: Scientific Software International.

Kayaduman, H., Sırakaya, M. & Seferoğlu,S.S. (2011). Eğitimde FATİH Projesinin Öğretmenlerin Yeterlik Durumları Açısından İncelenmesi. *Akademik Bilişim, 2-4.*

Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. *Computers & Education, 49*, 740-762.

Koç, M., & Bakır, N. (2010). A Needs Assessment Survey To Investıgate Pre-Servıce Teachers'. *The Turkish Online Journal of Educational Technology, 9*(1), 13-22.

Krumsvik, R. (2006). The digital challenges of school and teacher education in Norway: Someurgent questions and the search for answers. *Education & Information Technologies,11,* 239-256.

Kumar, N., Rose, R.C. & D'Silva, J.L. (2008). Teachers' readiness to use technology in the classroom: An empirical study. *European Journal of Scientific Research, 21*(4), 603-616.

Lloyd, M. & Irvine, S. (2005). Digital pedagogy: Finding the balance in an online learning and teaching environment. Retrieved June 15, 2012, from http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/44_Lloyd.pdf.

Martin, C.R., & Newell, R.J. (2004). Factor structure of the hospital anxiety and depression scale in individuals with facial disfigurement. *Psychology Health and Medicine, 3*,327-336.

Mishra, P. & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Parigi, L. & Rossi, F. (2011). Pedagogical digital competence in Italy. From teachers' perceptions to syllabus designICERI2011, Proceedings, ISBN: 978-84-615-3324-4.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *The Horizon, 9*(5), 1-6.

Reimann, P., Freebody, P., Hornibrook, M., & Howard, S . (2009). *Immersive learning environments: A study of teachers' innovation using The Le@rning Federation's digital learning resource*s. Melbourne, Victoria: Curriculum Corporation, (pp. 73)

Roblyer, M.D. & Edwards, J. (2000). *Integrating educational technology into teaching. Merrill*, NJ: Prentice Hall.

Salmon, G. (2002). *E-tivities: The key to active online learning*. London: Kogan Page.

Sandholtz, J., Ringstaff, C. & Dawyer, D. (2002). The evolution of instruction in technology- rich classrooms. In R. Pea (ed.), *Technology and learning* (pp. 255 – 276). San Franscisco: Jossey-Bass.

Schriesheim, C.A., & Eisenbach, R.J. (1995). An exploratory and confirmatory factor analytic investigation of item wording effects on obtained factor structures of survey questionnaire measures. *Journal of Management, 6*, 1177-1193.

Shevlin, M.E., & Lewis, C.A. (1999). The revised social anxiety scale: Exploratory and confirmatory factor analysis. *The Journal of Social Psychology, 2*, 250-252.

Teo. T., Chai, S. C., Hung, D., & Lee, C. B. (2008). Beliefs about teaching and uses of technology among preservice teachers. Asia-Pacific Journal of Teacher Education, 36(2), 163-174.

Topkaya, E. Z. (2010). Pre-Servıce Englısh Language Teachers' Perceptıons of Computer Self-Efficacy and General Self-Efficacy. The Turkish Online Journal of Educational Technology, 9(1), 143-156.

Wagner, T. (2008). *The Global Achievement Gap*. New York: Basic Books.

Willett, R. (2007). Technology, pedagogy and digital production: a case study of children learning new media skills. Learning, Media and Technology, 32 (2) 167-181.

Yurdakul, K. I. (2011). Öğretmen Adaylarının Teknopedagojik Eğitim Yeterliklerinin Bilgi ve İletişim Teknolojilerini Kullanımları Açısından İncelenmesi. *Hacettepe University Journal of Education*, 40, 397-408.

Undergraduates Who Have a Lower Perception of Controlling Time Fail To Adjust Time Estimation Even When Given Feedback

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ABSTRACT

Although there are many studies that have investigated the impact of time management, little research has examined empirically time management. The present study investigated the relationship between the perceived control of time scale and the degree of adjustment in repeated time estimation. Undergraduates were assigned to either an adjustment group or a no-adjustment group. The two groups were asked to estimate the time necessary to complete a task before each trial. The experimenter informed adjustment group participants of the time spent on the previous task before they made time estimates for the next trial. The no-adjustment group participants were not informed of time spent on the previous task. The time estimation trial was repeated ten times. Results indicated that (a) only those in the adjustment group who had higher perceived control of time adjusted time estimates, (b) participants in the adjustment group with low perceived control of time and all participants in the no-adjustment group did not adjust their estimates. These results suggest that not only is it necessary to know the time spent on past tasks, but also it is necessary to have a high perceived control of time in order to adjust time estimates.

Keywords: *time estimation, perceived control of time, adjustment, time management, undergraduate.*

INTRODUCTION

Many undergraduates experience time management problems and suffer from time pressure. One coping strategy offered by university counselling services is time management. Although there are examples of books dealing with time management, such as Lakin's (1989) *How to get Control of Your Time and Life*, most advice on time management has not been based on the scientific research (Macan, Shahani, Dipboye, Philips, 1990; Macan, 1994). Macan et al (1990) developed a questionnaire regarding time management and found that a factor called *perceived control of time*, characterized by participants' perception of having enough time to finish their work, was important in time management. Some studies have demonstrated perceived control of time as a meaningful predictor of job satisfaction, performance, and various indicators of well-being, such as tension, work strain, sorrow, pleasure, and health (Adams & Jex, 1999; Claessens et al., 2004; Häfner & Stock, 2010; Macan, 1994; Macan et al.). These finding led to research showing that perceived control of time acts as a mediator between time management behaviors and indicators of job satisfaction, well-being, and performance (Adams & Jex, 1999; Claessens, Van Eerde, Rutte, & Roe, 2004; Macan, 1994). Thus, perceived control of time must be considered an important factor in time management.

Although time management studies since Macan et al. (1990) have continued to use questionnaires to measure time management beliefs as well as behaviors, it should be noted that responses on time management scales did not always reflect actual time management behaviour. Thus, in order to capture the essential features of the time

management construct, it might be useful to consider it from points of view other than social psychology. Some empirical studies of time management have been based on cognitive psychology (e.g., Burt & Kemp, 1994; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004; Roy, Christenfeld, & McKenzie, 2005). Most of the studies based on cognitive psychology asked a participant to estimate the time required for a task before conducting the task; however, only Francis-Smythe and Robertoson (1999) tested the relationship between time estimation and time management.

Francis-Smythe and Robertoson (1999) found a relationship between a score on the perceived control of time scale and accuracy in a duration estimation task. However, they only used the time estimation task once; the task was not repeated. In the real world, some jobs require workers to repeat similar tasks day after day. Even when they are given new tasks, some workers gradually become accustomed to the work and acquire the ability to estimate the time required. On the other hand, other workers have difficulty in estimating task time even when they have become accustomed to the task. In this regard, perceived control of time may affect the degree of adjustment in time estimation. If, in fact, perceived control of time affects time management, then those who have a high perceived control of time might effectively adjust their estimation of the time required for the repetition of a task. The present study, therefore, extends the work of Francis-Smythe and Robertoson (1999) by exploring relationships between perceived control of time and degree of adjustment in time estimation.

THE STUDY

In this experiment we investigated whether those with a high perceived control of time could adjust their estimate of the necessary time for a trial. We accomplished by assigning participants to either an adjustment or a no-adjustment group. We asked each participant to estimate the required time before each task started. Then, the experimenter informed participants in the adjustment group of the amount of time spent on the previous trial, which could act as the cue for the adjustment. The participants in the no-adjustment group were not informed about the amount of time spent on the previous task. Finally, the participants again made estimates of the time required to complete a trial. This process was repeated for ten trials. The amount of work required was different for each trial.

In this experiment, we hypothesized that only those in the adjustment group who had a high perceived control of time would be able to adjust their estimates of the time required for a task as they progressed through the series of trials.

METHOD

Participants

The participants were undergraduate students at the authors' university. They received credit in their Psychology class as a reward for participating. We tested 40 participants (16 male, 24 female) with a mean age of 19.7 (range: 18-22 years).

Perceived control of time (PCT)

The seven items assessing the extent to which participants perceived their control of time were taken from Macan et al. (1990), Macan (1994), and Claessens et al. (2004). These items included the following: "I find it difficult to keep to a schedule because others take me away from my work," "I underestimate the time that it would take to accomplish tasks," "I must spend a lot of time on unimportant tasks," "I find myself procrastinating on tasks that I don't like but that must be done," "I feel that I have my work under control," "I feel confident in that I am able to complete my work on time," and "I often have little control of what is happening at work." The responses were made using a 4-point Likert scale (each scale range: 1~4; total range: min 7- max 28). The coefficient alpha for this scale was .75.

Time Estimation task

We created the time estimation task by modifying part B of the Trial Making Test (TMT). The TMT has been used widely as an executive function test (Corrigan & Hinkeldey, 1987). It requires subjects to connect a series of numbered and lettered circles, alternating between the two sequences.

All participants were asked to estimate the time required (sec) before each trial. And then, after finishing the task the adjustment group was informed of the time spent completing it. In the no-adjustment group, participant was not given the information about the time spent on the task. This process was repeated ten times. We changed the difficulty of the trial by varying the length of the series of numbered and lettered circles. The average number of circles was 25 (range: 15 - 40).

We scored both the actual time spent (sec) and the participants estimated time. We defined the time estimation

error as the absolute differences between the time spent and the time estimate made before a trial. We used the mean of the time estimation errors over ten times as the dependent variable.

Procedures

First, the experimenter asked a participant to answer the perceived control of time scales. Then, participants were assigned either were randomly assigned to either an adjustment group (n = 20) or a no-adjustment group (n = 20). Third, the experimenter showed the participant a TMT sheet for three seconds. After viewing the amount of numbered and lettered circles, the participant was asked to estimate the time necessary for the task. After finishing the task, only a participant assigned to the adjustment group was informed of the actual time spent; a participant assigned to the no-adjustment group (control condition) was not informed of the actual time spent. For each trial, the amounts of circle randomly changed and were as follows: 15, 17, 19, 20, 22, 24, 27, 30, 36, and 40. The trial was repeated ten times.

RESULTS

We assigned participants to either a high or low perception of time control group based on a median split (Md = 2.13). Eight participants whose score was near the median value score were excluded, leaving 32 participants for statistical analysis. The participants who had higher scores than the median value were classified into the high perception of time control group (n = 15: adjustment 7; no-adjustment 8), whereas the participants who had lower score than the median value were classified into the low perception of time control group (n = 17: adjustment 9; no-adjustment 8). The mean (SD) of the time estimation errors over ten trials and the mean perception of control of time scores can be seen in Table 1. There was no significant difference of sex of participant with respect to time estimation error (t = 1.33, df = 30, p > .05). Also, the results indicated that the difference between sexes on the perceived control of time scale was not significant (t = 0.40, df = 30, p > .05). Therefore, the data for both male and female were combined for subsequent statistical analyses.

Table 1

Means (SD) on Perception Time of Control and Error of Time Estimation.

Variable	Male (n = 13)	Female (n = 19)	Total (n = 32)
Perceived time of control	2.38 (0.44)	2.11 (0.66)	2.22 (0.59)
Error of time estimation (sec)	11.05 (2.66)	11.10 (3.48)	11.08 (3.13)

Table 1 showed the mean time estimation error as a function of perceived control of time (high and low) and the no-adjustment and adjustment conditions. We conducted a mixed model design 2 × 2 ANOVA with group (no-adjustment vs. adjustment) as between-subject factor and perceived control of time (high vs. low) as within-subject factor. The ANOVA revealed significant the interaction between two factors (F (1, 28) = 4.21, η^2 = .12, p < .05). Post hoc analysis showed that there was the difference between high and low perceived control of time in the adjustment group (F (1, 28) = 6.56, p < .05). There were no main effects of the group (F (1, 28) = 2.93, η^2 = .08, p > .05) and the perceived control of time (F (1, 28) = 251, η^2 = .07, p > .05). The result indicated that only those in the adjustment group with a high perceived control of time were able to adjust the time required for a trial based on repetition, when compared with other conditions.

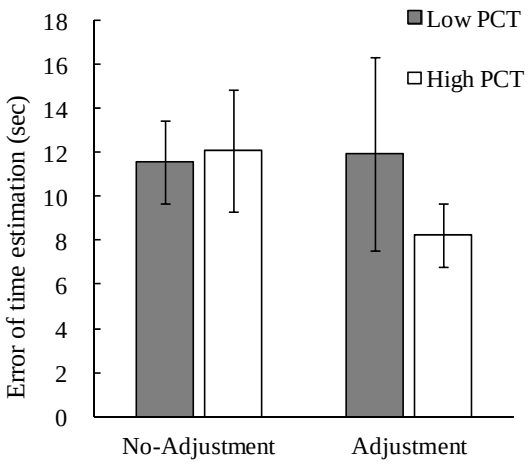

Figure 1. Mean Error of Time Estimation at the Low and High Perceived control of time (PCT) in the No-Adjustment and Adjustment condition.

DISCUSSION

This study hypothesized that undergraduates who have a high perceived control of time could appropriately adjust the time required for a task by the repetition of that task. The results supported our hypothesis by indicating that differences between workers who can adjust their time estimate for performing a task and those who cannot might be related to differences in their perceived control of time.

The results suggest that the more one has a perception of controlling time, the more one could appropriately adjust the estimation of the time required for a task. As a consequence, those high in perceived control of time might perform at a high level, as proposed in the time management model found in Macan (1994) and Claessens et al. (2004). Thus, the results extend the work of Macan (1994) and Claessens et al. (2004). However, it should be noted that the present study could not establish the casual connection. Moreover, the duration of each trial in the time estimation task was shorter than that in other studies. Future research, should investigate the relationship using tasks similar to real world tasks, which require more time. Although time management studies have continued since Macan's work (1994), all time management studies were conducted with questionnaires and frequently did not use an empirical method. Therefore, we assumed that a response on the time management scales did not always reflect actual time management behaviour. In the present study, we used an empirical method to examine the relationship between perception of time control and the degree of adjustment of time estimation for a task.

Our study was the first to demonstrate that a feeling of time management might relate to the ability to adjust time estimates for repeated tasks. This research, in the future, will help many undergraduates who have poor time management. Moreover, the present study extends the work of Francis-Smythe and Robertoson (1999) by showing a relationship between perceived control of time and the ability to adjust time estimates. Future research that connects time management and time estimation is needed.

REFERENCES

Adams, G. A., & Jex, S. M. (1999). Relationships between time management, control, work-family conflict and strain. *Journal of Occupational Health Psychology*, 4, 72–77.

Burt, C. D. B., & Kemp, S. (1994). Construction of activity duration and time management potential. *Applied Cognitive Psychology*, 8, 155-168.

Corrigan, J. D., & Hinkeldey, M. S. (1987). Relationships between parts A and B of the Trail Making Test. *Journal of Clinical Psychology*. 43, 402–409.

Claessens, B. J. C., Van Eerde, W., Rutte, C. G., & Roe, R. A. (2004). Planning behavior and perceived control of time at work. *Journal of Organizational Behavior*, 25, 937–950.

Francis-Smythe, J. A., & Robertoson, I. T. (1999). On the relationship between time management and time estimate. *British Journal of Psychology*, 90, 333-347.

Häfner, A., & Stock, A. (2010). Time Management Training and Perceived Control of Time at Work. *The Journal of Psychology: Interdisciplinary and Applied*, 144, 429-447.

Lakein, A. (1989), *How to get control of your time and your life* (2nd. ed.). New York: New American Library.

Macan, T. H. (1994). Time management: Test of a process model. *Journal of Applied Psychology*, 79, 381–391.

Macan, T. H., Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). College students' time management: Correlations with academic performance and stress. *Journal of Educational Psychology*, 82, 760–768.

Roy, M. M., Christenfeld, N. J. S., & McKenzie, C. R. M. (2005). Underestimating the duration of future events: Memory incorrectly utilized or memory bias? *Psychological Bulletin*, 131, 738– 756.

The Role of Adequate Nutrition on Academic Performance of College Students in North Tripura

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ABSTRACT

The development of a nation is closely interlinked with the education level of its population. Various studies have provided enough evidence of the importance of proper nutrition to the cognitive development of an individual which also affects their education achievements. Bur till date, the pathway as to how nutrition develops or hinders academic achievement is still not very clear. It has been established that poor health and malnutrition in early childhood may affect cognitive abilities. This study looks into the effect of nutritional on college students in North Tripura district which has hitherto not been documented earlier. The study shows that, the tribal students have lower BMI values than their nontribal counterparts which may be due to the tribal students having less access to convenience foods. Their poor nutritional status reflects in their academic achievements which are lower than their nontribal counterparts.

Keywords: *Nutrition, College students, Tripura, Academic status.*

INTRODUCTION

Since national or community development depends largely on the quality of education, an understanding of the nature of the relationship between health and education is important for policy planners as well as the masses. It is generally believed that the basis for any true development must commence with the development of human resources [1]. It has been argued that health is an important factor for academic achievement at school [2,3] and in higher education [4]. Consequently, in the context of universities or colleges, promoting the health and well-being of all members means promoting effective learning [5]. A systematic literature review to examine whether school health programmes improved academic success provided positive evidence for at least some programmes [6]. Chronic malnutrition experienced during early life inhibits growth, retards mental development, and reduces motivation and energy level, causing a reduction of educational attainments and delay in school entry [2]. This study hopes to find out the relationship between the nutritional status of college students and its effect on their academic status in a sample of college students in Dharmanagar district in North Tripura, India, which has not been documented by any workers earlier.

Review Of Literature

The potential for health to improve cognitive function, learning and academic achievement in children has received attention by researchers and policy makers [34]. It is widely accepted that

health and well-being are essential elements for effective learning [2]. It is also seen that education is a strong predictor of lifelong health and quality of life in different populations, settings, and time [35]. But as to how education leads to better health and longer life expectancy are still not clearly understood. It is widely held, however, that education, health, and social outcomes are very closely interdependent [36].

Malnutrition is a major problem across the world, both in developed and developing countries and deficiencies in some nutrients have been reported to cause diseases which could lead to impaired cognitive development [5]. Many other studies have related lifestyle of students, particularly breakfast consumption, to their cognitive abilities as reflected in their academic performance [6-8]. But sadly, most of these studies have failed to include young adults or even adolescents studying in the tertiary institution. Undernourished children have been shown to have decreased attendance, attention, and academic performance as well as experience more health problems compared to well-nourished children [15,18]. More recently, studies have examined the impact of breakfast on cognition, behavior, and academic performance of school-age children [15,19-21]. Most studies of health-promoting profiles of students, such as the European Health and Behavior Survey conducted in 20 countries, did not explore the associations]between health and academic achievement [23).Conversely, most studies of the factors associated with students' educational attainment were mainly concerned with educational and/or demographic variables and did not concurrently explore the students' health-related parameters [25]. Geographically, the majority of research conducted assessed the associations between health/health programmes and academic achievement and were undertaken in the USA [26-28], with fewer studies from the UK or elsewhere [25]. Also the associations between health/health programmes and academic attainment were mostly examined in elementary, middle or high school children [29-33], rather than university/college students [25].

Low anthropometric measurements (height-for-age, weight-for height and head circumference) have been frequently associated with poor school outcomes.[2,3–6,34-36]. In fact, in several of the studies, the relationship remained significant, even after controlling for socioeconomic variables.[3-5,9]. Iron-deficiency anemia, missing breakfast and helminthic infections have also been reported to affect school performance [3–6,34-36]. Eating disorders create a variety of medical conditions that occur more frequently in the college-age population. [50]. According to Gardner and Grantham-McGregor the mechanisms which link undernutrition and poor development in children are not well understood, although children who were moderately to severely malnourished during their early childhood show delayed development [37].

Studies of nutrition and academic performance have typically focused on hunger, malnutrition, and micronutrient deficiency [38-40]. The predominant approach to studying diet has focused on the role of individual nutrients or foods [41].However; individuals do not consume single nutrients but combinations of foods [42]. In recognition of the multidimensional nature of diet, studies of the interrelations of nutrition and health have examined the effects of overall diet quality using summary measures of food and nutrient intake [42,43].Academic performance influences future educational attainment and income, which, in turn, affect health and quality of life [44]. Moreover, as increased levels of educational attainment and income facilitate increased understanding of nutrition messages and access to healthy food, [45,47] This relationship has been observed as steady across different levels of socioeconomic status [49].

METHODOLOGY

The study was conducted on undergraduate students of Government Degree College, Dharmanagar, North Tripura. Subjects were randomly selected from across the all faculties in the

campus. All the subjects were day scholars.Hostel dwellers were excluded from the ambit of the study to retain parity in subject selection as well as their diet. Subjects who had taken ill in the last 4 weeks and those currently on medication will be exempted from the study. The age group of the subjects was 19-22 years and the same was verified from their date of birth as recorded in their School leaving examination admit card. A total of one hundred students (58 girls and 42 boys) completed the survey from one hundred fifteen students selected for the survey. All the subjects were explained the modalities and objectives of the study and informed oral consent were taken both from the subjects as well as the principal of the college for undertaking the study.

Recording of height and weight of the subjects were carried out with the help of an anthrop meter and a weighing machine respectively which was calibrated every day before the start of work. All the anthropometric measurements were taken following the standard techniques recommended by Lohman *etal*. [53]. BMI was calculated as per WHO norms. It is calculated as the weight in kilograms divided by the square of the height in meters (kg/m2). BMI is age-independent and the same for both sexes [54]:

$$\text{Body Mass Index : } = \frac{\text{Body weigh t in kg}}{\text{Body height in m}^2}$$

There has been a large number of divergent views as to how many days of dietary survey is required to exactly represent the intake of an individual. These range from one day recall method to seven days weighment method But it has been agreed that the number of days of survey is dependent on the type of work to be done with the data. Thus for example, epidemiological survey like National Sample Survey relies on 24 hour recall method while surveys of small population can be done over a period of seven days. So for this study , dietary survey was conducted on each individual for a period of seven days. From this data, the nutritional status of each individual was calculated with the help of food composition table [57]. Standard Diet survey questionnaire as used by National Institute of Nutrition and ICMR modified as per local requirement was used in the collection of food consumption data.

Academic performance of the students was assessed by the marks scored by the students in the test exam conducted by the college prior to them being sent up for their university final exam. Since the students had a combination of subjects, so to bring in parity in assessment, the percentage of the total marks scored by the students were taken into consideration to rule out bias.

Statistical analysis was done using SPSS version 10 to find out the means and also to test for relationship between various dietary nutrients on academic achievement. Correlation between various nutrients and academic achievement were calculated .Regression equations of detailing the effects of certain major nutrients on academic achievement of the students were also developed

RESULTS

TABLE:1- Age And Sex Distribution Of The Studied Population:

Age Range	Tribal Males	Tribal Female	Total Tribal Subjects	Non Tribal Males	Non Tribal Females	Total Non Tribal Subjects	Grand Total
Adolescent (19-23 yrs)	**27**	**15**	**42**	**31**	**27**	**58**	**100**

A total of 58 nontribal and 42 tribal students took part in the survey. Of the 100 students 58 were male and 42 were female.(Table 1 and Fig 1).

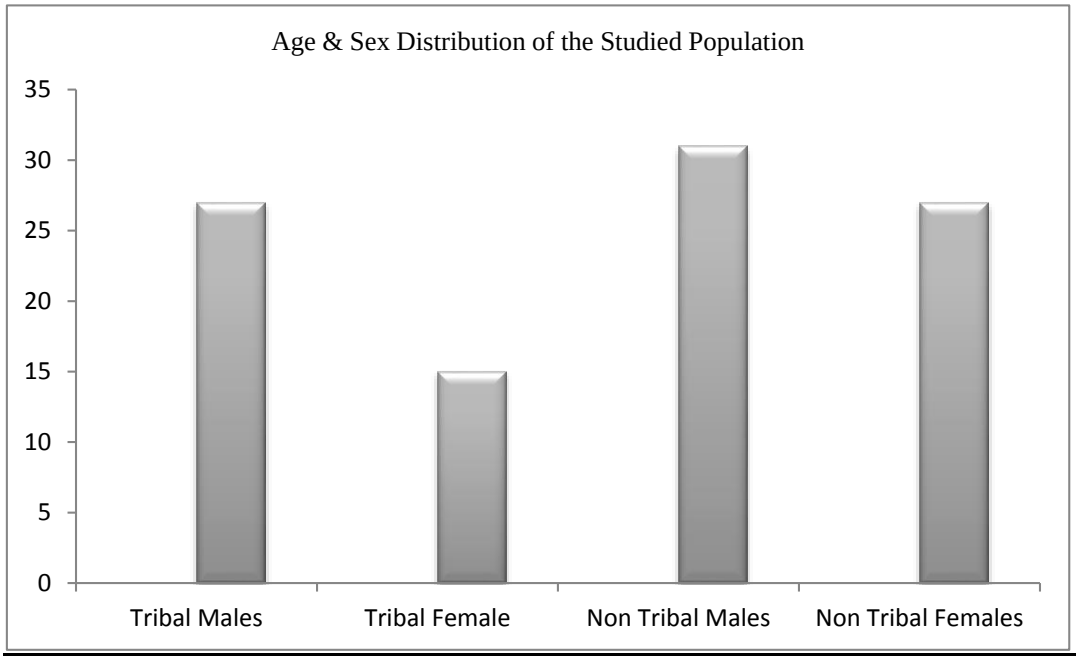

Fig 1 - Age and Sex Distribution of the Studied Population:

Table: 2 BMI Values Of The Surveyed Population (Mean Value)

CATEGORY	BMI VALUES
Tribal Males	18.9
Tribal Females	18.6
Non tribal Male	19.2
Non tribal Female	19.4

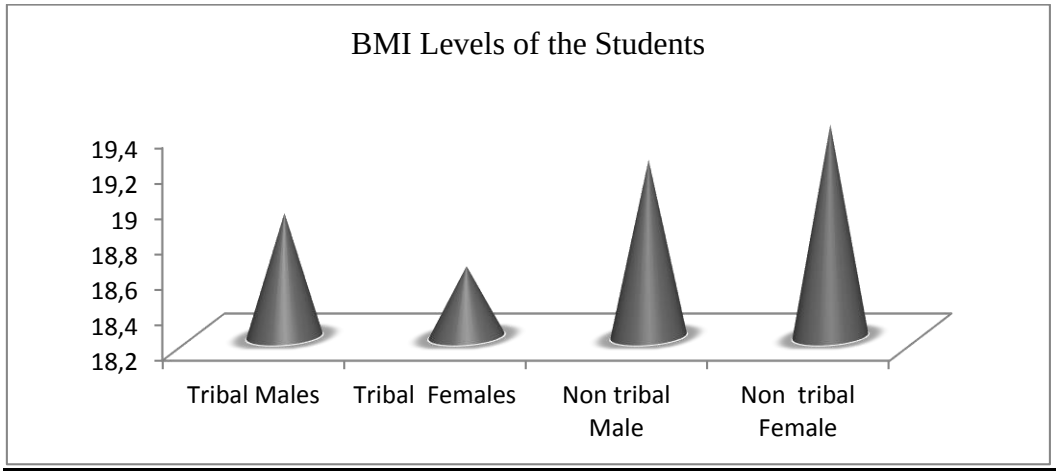

Fig 2 – BMI Levels of the Students

A study of the BMI values of the surveyed population shows that nontribal students have a higher BMI value than their tribal counterparts(Table 2), but from the BMI values we can interpret that chronic undernutrition is not present in any of the study groups(Fig 2). The higher BMI levels in the nontribal students may be due to their food habit which is completely different from their tribal counterparts. While the tribal students partake of home cooked meals where they use very little of spices and mostly use boiled foods, the nontribal students seem to have an affinity for fast foods available in outlets across the town. Their food also is mostly fried or cooked for a long period of time with a whole lot of spices so as to make it more palatable.

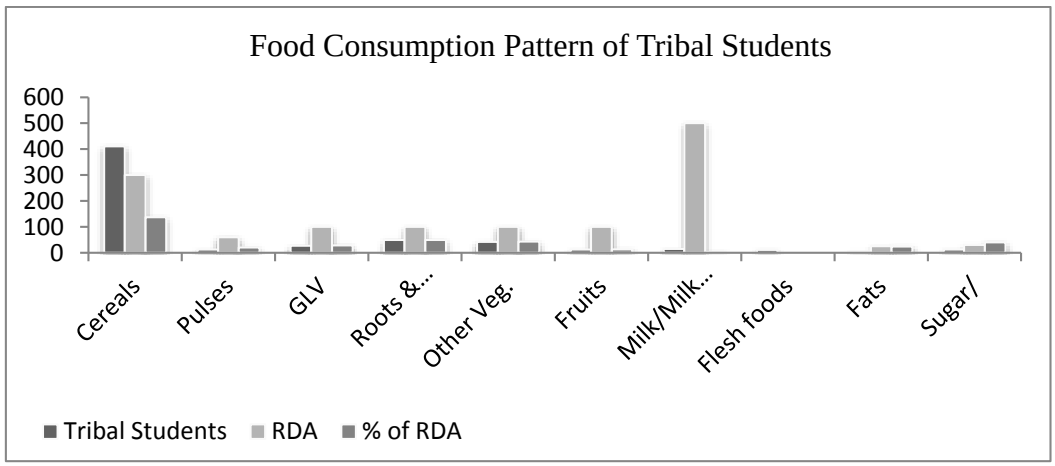

Fig 3 – Food Consumption Pattern of Tribal Female Students

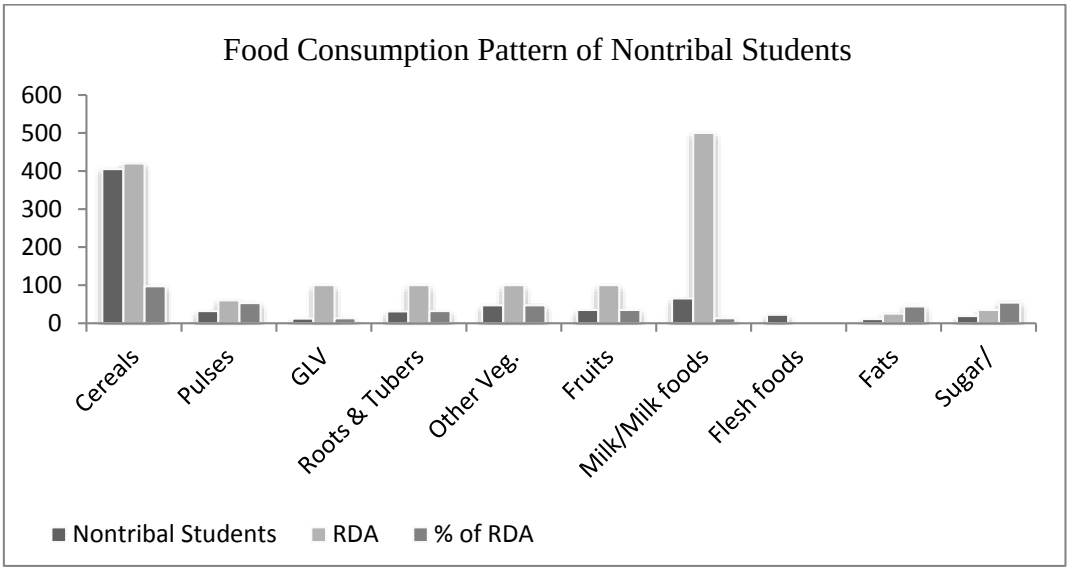

Fig 4 – Food Consumption Pattern of Nontribal Male Students

An analysis of the dietary survey data brings forth the fact that the tribal students take in more of cereals, green leafy vegetables, roots and tubers. Their consumption of fats, flesh foods and fruits are minimum(Fig.3) .This may be due to the higher cost associated with these food groups which they can ill afford. On the other hand the non tribal students take in fewer amounts of vegetables, but compensate this with a higher consumption of fruits(Fig.4). The consumption of milk is also quiet high in this population. They also take in a lot of flesh foods along with higher amounts of fats and sugar. This may also be the causative factor for the higher BMI levels seen in this group. The later sections help to reveal the nutrient consumption of the surveyed population which were calculated by transposing these dietary survey food consumption data on to the food consumption table

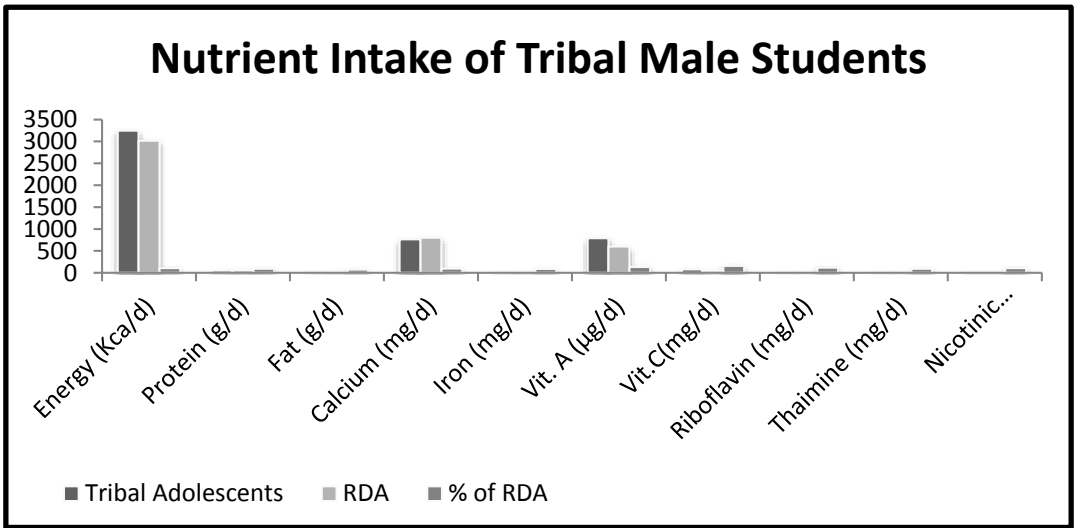

Fig 5 – Nutrient Intake of Tribal Male Students

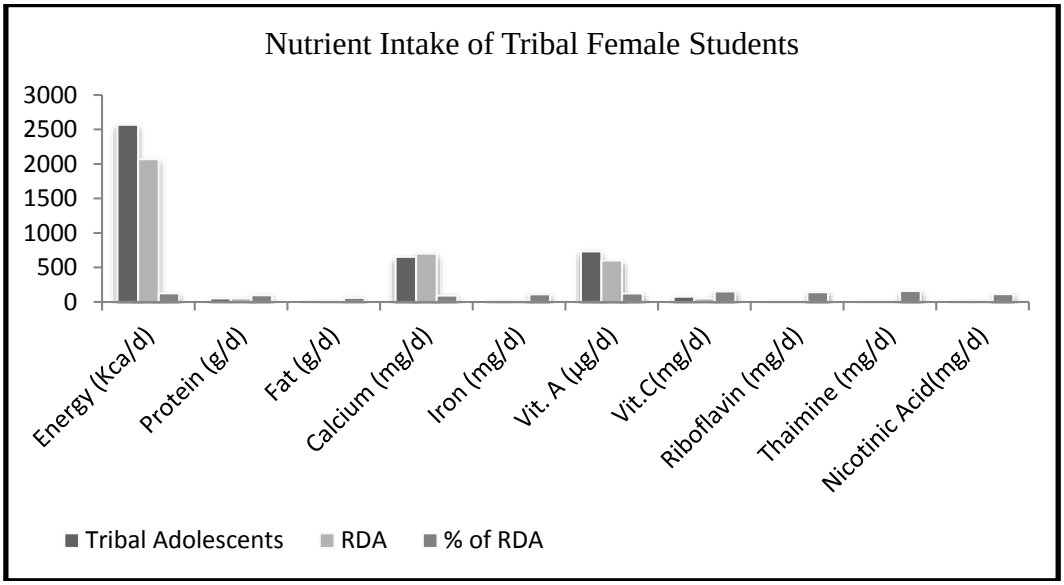

Fig 6 – Nutrient Intake of Tribal Female Students

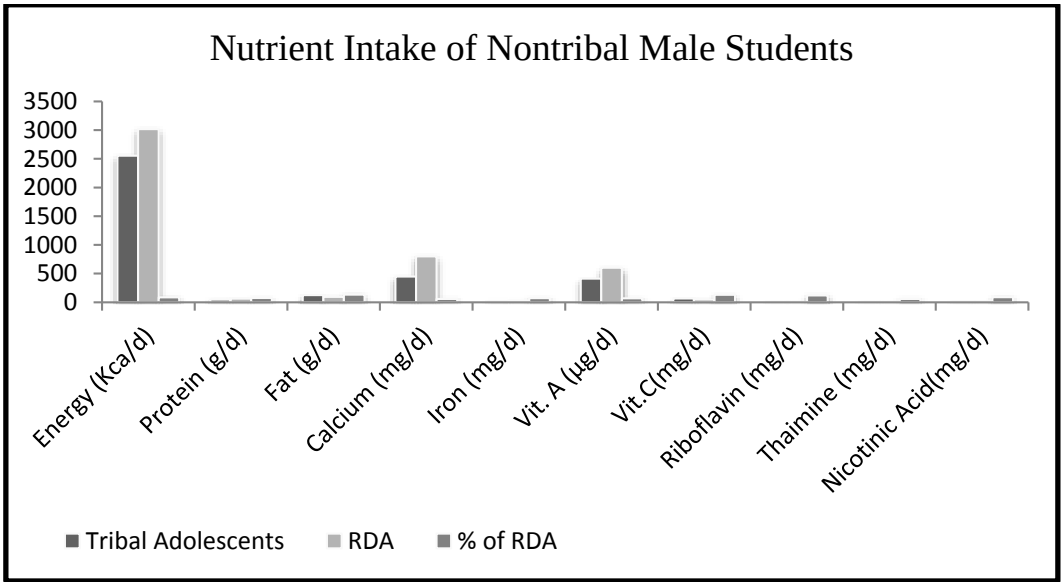

Fig 7– Nutrient Intake of Nontribal Male Students

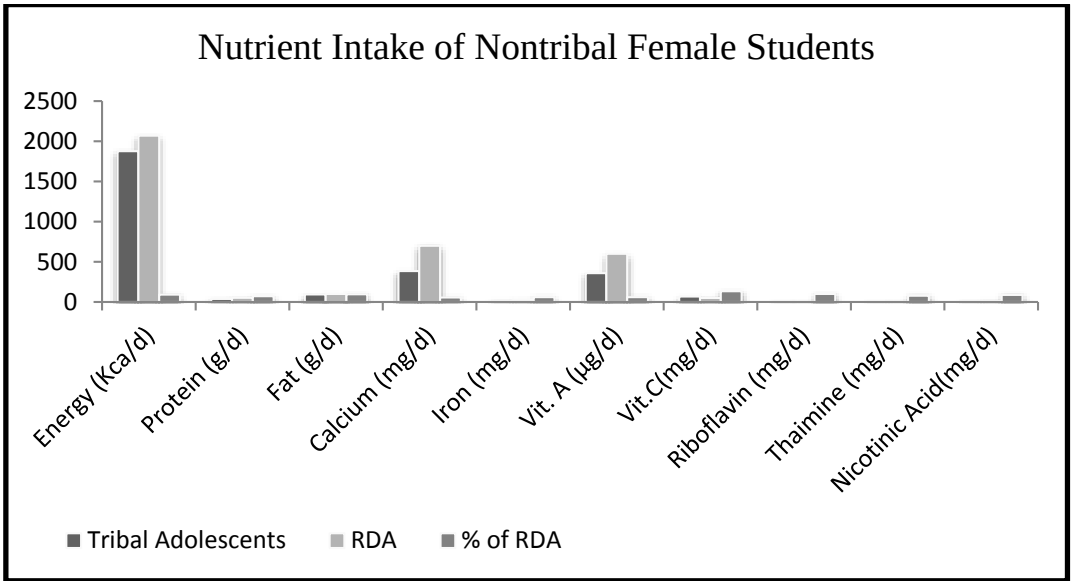

Fig 8 – Nutrient Intake of Nontribal Female Students

Thus the nutrient consumption table shows that the energy consumption of tribal students is slightly higher, but a major difference exists in the energy availability in the female students(Fig.6). While tribal female students have adequate energy consumption, the nontribal populace suffers from deficient energy consumption(Fig.5). This may due to food fads in females and also the influence of television or peer pressure to remain thin. The protein consumption levels are almost similar but fat intake is very less in the nontribal group(Fig.7). But then the levels of consumption of other minerals like calcium, iron and those of various vitamins are quiet high in the tribal group than in the nontribal population. This may be due to the intake of more of vegetables in the tribal group than the nontribal students(Fig.8).

TABLE: 5- Category wise Percentage Achievement

Category	<20	21-30	31-40	41-50	51-60	>60
Tribal Male	2	6	11	4	2	2
Tribal Female	3	4	4	3	1	Nil
Nontribal Male	10	11	7	1	2	Nil
Nontribal Female	4	10	6	3	3	1

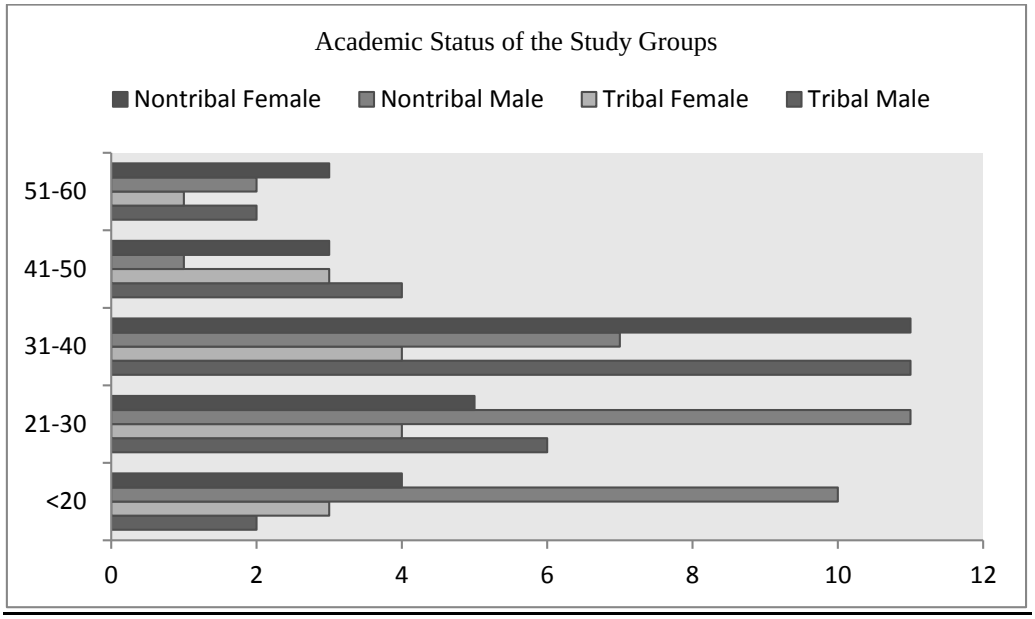

Fig 9 - Academic Status of the Study Groups

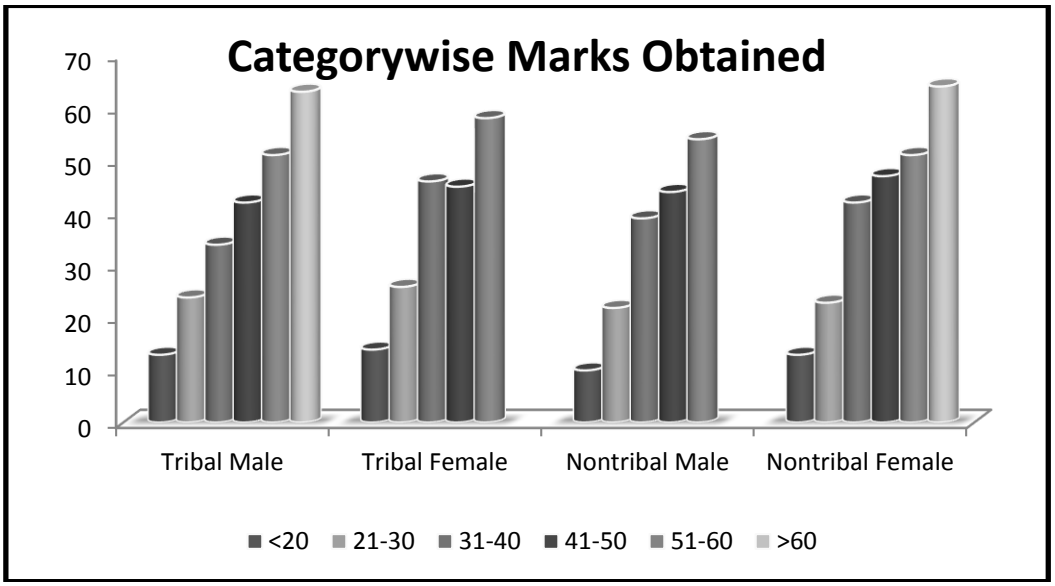

Fig 10 - Category wise Average Marks Obtained

The academic performance of the study group is detailed in Table.5,Fig.9 and Fig.10.A study of these table and figures show that there exists a difference in academic performance of the two groups. These were analyzed with later to find out the correlation between various dietary factors and academic performance.

The data from the study was analyzed with the help of SPSS (version-10) software to find out the correlation between academic status of the students of the study group and the various factors, and also to develop regression equations to understand the degree of association between the various variables that affect the academic status of these students. They are detailed below:

i) The correlation coefficient between BMI and academic status was found to be 0 .236 (R square value at 0.005 level of significance). Thus BMI levels are negatively correlated, albeit weakly with academic achievement.

The relationship can be better explained with the help of the following linear regression

equation :

E = 159.92 – 0.486 B

SE (162.893) (8.561),

Where, E = Academic Status of the study group, B = BMI of the study group and SE = standard error of estimate.

ii) The correlation coefficient between Fat intake and academic status was found to be 0 .725 (R square value at 0.005 level of significance).This denotes a strong negative correlation between Fat intake and academic status of the study group. The relationship can be better explained with the help of the following linear regression equation :

E = 36.607 - 0.852 F

SE (2.586) (0.033),

Where, E = Academic Status of the study group, F = Fat intake of the study group and SE = standard error of estimate.

iii) The correlation coefficient between Vitamin-C intake and academic status was found to be 0 .582 (R square value at 0.005 level of significance).This denotes a strong positive correlation between Vitamin-C intake and academic status of the study group. The relationship can be better explained with the help of the following linear regression equation :

E = 8.299 + 0.763 VC

SE (24.134) (0.335),

Where, E = Academic Status of the study group, VC = Vitamin-A intake of the study group and SE = standard error of estimate.

CONCLUSION

The above study shows that that the tribal students have lower BMI values than their nontribal counterparts which may be due to dietary differences – tribal students have less access to convenience foods and as such may have less consumption of these type of empty calorie containing foods. This dietary differences are reflected in the academic achievements of tribal students which are a little lower than their nontribal counterparts. This relationship becomes well established with the help of the regression equations developed whereby a negative correlation between BMI and academic achievement is observed.

The dietary survey shows that tribal students take in more of cereals, green leafy vegetables, roots and tubers. Their consumption of fats, flesh foods and fruits are minimum .This may be due to the higher cost associated with these food groups which they can ill afford. When these dietary survey data are converted to energy and nutrient consumption with the help of food composition tables it is seen that the energy consumption of tribal students is slightly higher, but a major difference exists in the energy availability in the female students. While tribal female students have adequate energy consumption, the nontribal populace suffers from deficient energy consumption. Consumption of other minerals like calcium, iron and those of various vitamins are also quiet high in the tribal group.

Statistical analysis of these nutrients consumption data with that of their academic achievement provides valuable insight into the role of various nutrients in academic achievement

of these students. It was found that BMI and fat consumption levels are negatively correlated with academic achievement. Though the correlation of BMI with academic achievement is weak, fat consumption is strongly correlated with academic achievement. This may be due to the fact that fats form a crucial part of the neuronal circuitry. All other nutrients are positively correlated with academic excellence. Of the various vitamins, Vitamin C has the strongest correlation with academic status, followed by Vitamin A Riboflavin and Thiamine respectively. This correlation may be because, all these vitamins are particularly important for neuronal development as well as neuronal connectivity and signal processing and transmission.

Thus from the above study and analysis of the data generated, we can conclude that nutritional status of a college student has definite relationship with his/her academic achievement.

REFERENCE

1) Pollitt, E.; "Nutrition and Educational Achievement." Nutritional Education Series, 1984; Issue 9. ED-84/WS/66. UNESCO, Paris

2) Popkin BM, Lim-Ybanez M. 1982. Nutrition and school achievement.SocSci Med. 16: 53–61.

3) Jamison DT. Child malnutrition and school performance in China.J Dev Econ 1986; 20: 299–309.

4) Moock PR, Leslie J. 1986. Childhood malnutrition and schooling in the Terai region of Nepal. J Dev Econ.20: 33–52.

5) Johnston FE, Low SM, Baessa YD, MacVean RB. 1987. Interaction of nutritional and socioeconomic status as determinants of cognitive development in disadvantaged urban Guatemalan children.Am J PhyAnthropol. 73: 501–506.

6) Sigman M, Neumann C. 1989. Cognitive abilities of Kenyan children in relation to nutrition, family characteristics and education. Child Dev. 60: 1463–1474.

7) Pollit E, Watkins WE, Husaini MA. 1997. Three month nutritional supplementation in Indonesia infants and toddlers, benefit child memory function 8years later. Am. J. Clin. Nutr. 66: 1357-1363.

8) Lisa MS. 1998.The correlation between eating breakfast and school performance. Am .J. Clin Nutr. 65: 7795-9845.

9) World Health Organization, Young people's health. a challenge for society; report of a WHO Study Group on Young People and Health for All by the Year 2000. Geneva: World Health Organization. Technical Report, 1986; Series No. 731, 1-117.

10) Matsuhashi Y. 2000. Thinness: drives and results. J. Adolesc. Health. 27: 149-150.

11. Ryan YM, Gibney MJ, Flynn MA. 1998. The pursuit of thinness: a study of Dublin schoolgirls aged 15 y. Int. J. Obes. Relat. Metab. Disord..22:485-487.

12) Thompson AM, Chad KE. 2003. The relationship of social physique anxiety to risk for developing an eating disorder in young females. J. Adolesc. Health. 31: 183-189.;

13) Jones JM, Bennett S, Olmsted MP, Lawson ML, Rodin G. 2001. Disordered eating attitudes and behaviours in teenaged girls: a school-based study. Can. Med. Assoc. J. 165: 547-552.;

14) Weinshenker. 2002. Adolescence and body image. School Nurse News. 19:12-16.

15) Taras H. 2005. Nutrition and student performance at school. J Sch Health. 75:199-213.

16) Galal O, Hulett J. 2003. The relationship between nutrition and children's educational performance: a focus on the United Arab Emirates. Nutr Bull. 28:11-20.

17) Kretchmer N, Beard JL, Carlson S. 1996. The role of nutrition in the development of normal cognition. Am J Clin Nutr.63(suppl 1):997-1001.

18) Meyers AF, Sampson AE, Weitzman M. 1991. Nutrition and academic performance in school children. Clin Appl Nutr. 1:13-25.

19) Kleinman RE, Hall S, Green H, et al. 2002. Diet, breakfast and academic performance in children. Ann Nutr Metab. 46(suppl 1):24-30.

20) Rampersaud GC, Pereira MA, Girard BL, et al. 2005. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 105:743-760.

21) Pollitt P, Matthews R. 1998. Breakfast and cognition: an integrative summary. Am J Clin Nutr.67(suppl 1):804-813.

22) Kim HY, Frongillo EA, Han SS, et al. 2003 Academic performance of Korean children is associated with dietary behaviours and physical status. Asia Pac J Clin Nutr. 12(2):186-192.

23) Wardle J, Steptoe A. 1991. The European Health and Behaviour Survey: Rationale, Methods and Initial Results for the United Kingdom. Soc. Sci. Med. 33:925–936.

24) Al-Kandari F, Vidal VL. 2007. Correlation of the Health-Promoting Lifestyle, Enrollment Level, and Academic Performance of College of Nursing Students in Kuwait. Nurs. Health Sciences. 9:112–119.

25) Hoskins SL, Newstead SE, Dennis I. 1997. Degree Performance as a Function of Age, Gender, Prior Qualifications and Discipline Studied. Assess. Eval. Higher Educ. 22:317–328.

26) Elias MJ, Gara MA, Schuyler TF, Branden-Muller LR, Sayette MA. 1991. The Promotion of Social Competence: Longitudinal Study of a Preventive School-Based Program. Am. J. Orthopsychiatr. 61:409–417.

27) McCord MT, Klein JD, Foy JM, Fothergill K. 1993. School-Based Clinic Use and School Performance. J. Adolesc. Health. 14:91–98.

28) Eggert LL, Thompson EA, Herting JR, Nicholas LJ, Dicker BG. 1994. Preventing Adolescent Drug Abuse and High School Dropout through an Intensive School-Based Social Network Development Program. Am. J. Health Promot. 8:202–215.

29) Keeley TJH, Fox KR. 2009. The Impact of Physical Activity and Fitness on Academic Achievement and Cognitive Performance in Children. Int. Rev. Sport Exerc. Psychol. 2:198–214.

30) Felner RD, Jackson AW, Kasak D, Mulhall P, Brand S, Flowers N. 1997. The Impact of School Reform for the Middle Years. Phi Delta Kappan. 78:528–532.

31) Meyers AF, Sampson AE, Weitzman M, Rogers BL, Kayne H. 1989. School Breakfast Program and School Performance. Am. J. Dis. Child. 143:1234–1239.

32) Gall G, Pagano ME, Desmond MS, Perrin JM, Murphy JM. 2000. Utility of Psychosocial Screening at a School-Based Health Center. J. School Health. 70:292–298.

33) Flay B, Allred CG, Ordway C. 2001. Effects of the Positive Action Program on Achievement and Discipline: Two Matched-Control Comparisons. Prev. Sci. 2:71–89.

34) Ivanovic D, Marambio M. 1989. Nutrition and education. I. Educational achievement and anthropometric parameters of Chilean elementary and high school graduates. Nutr Rep Intl. 39: 983–993.

35) Keeley TJH, Fox KR. 2009. The Impact of Physical Activity and Fitness on Academic Achievement and Cognitive Performance in Children. Int. Rev. Sport Exerc. Psychol. 2:198–214.

36) Kolbe LJ. 2002. Education Reform and the Goals of Modern School Health Programs. Educ. Stand. 3:4–11.

37) Gardner JM, Grantham-McGregor S. 1998. Activity levels and maternalchild behavior in undernutrition: Studies in Jamaica. In: Pan American Health Organization Nutrition, Health and Child Development Scientific Publication. No 566. Washington, DC PAHO, 32–42.

38) Taras H. 2005. Nutrition and student performance at school. J Sch Health. 75:199-213.

39) Galal O, Hulett J. 2003. The relationship between nutrition and children's educational performance: a focus on the United Arab Emirates.Nutr Bull. 28:11-20.

40) Kretchmer N, Beard JL, Carlson S. 1996. The role of nutrition in the development of normal cognition.Am J ClinNutr. 63(suppl 1):997-1001.

41) Gerber M. 2001. The comprehensive approach to diet: a critical review. J Nutr. 131(suppl 11):3051-3055.

42) Kant AK. 1996. Indexes of overall diet quality: a review. J AmDiet Assoc. 96:785-791.

43) Patterson RE, Haines PS, Popkin BM. 1994. Diet quality index: capturing a multidimensional behaviour. J AmDiet Assoc. 94:57-64.

44) Ross CE, Wu C. 1995. The links between education and health. Am Sociol Rev. 60:719-745.

45) Veugelers PJ, Fitzgerald AL. 2005. Dietary intake and risk factors for poor diet quality among children in Nova Scotia. Can J Public Health. 96:212-216.

46) Kant AK. 2000; Consumption of energy-dense, nutrient-poor foods by adult Americans: nutritional and health implications: the third national health and nutrition examination survey, 1988-1994.Am J Clin Nutr. 72:929-936.

47) Turrell G, Hewitt B, Patterson C, et al. 2003. Measuring socio-economic position in dietary research: is choice of socio-economic indicator important? Public Health Nutr. 6:191-200.

48) Baranowski T, Mendlein J, Resnicow K, et al. 2000. Physical activity and nutrition in children and youth: an overview of obesity prevention. Prev Med. 31(suppl 1):1-10.

49) Considine G, Zappala G. 2002. The influence of social and economic disadvantage in the academic performance of school students in Australia.J Sociol. 38:129-148.

50) Grace, T.W., 1997. Health problems of college students.worsened after joining the university. J. Am. College Health, 45: 243-250.

51) Physical status: the use and interpretation of anthropometry. World Health Organ Tech Rep Series, 854, 1995. http://www.who.int/ bmi/index.jsp?introPage=intro_6.html as on 7th June, 2007.

52) Rao G, Yadav R, Dolla C K, Kumar S, Bhondeley M K,Ukey M. 2005. Undernutrition & childhood morbidities among tribal preschool children, Indian J Med Res. 122 -43.

53) Lohman, T G, Roche A F, Martorell R, Anthropometric Standardization Reference Manual, Human Kinetics Books, Chicago, 1998, 75.

54) World Health Organization. Measuring change in nutritional status. Geneva: World Health Organization, 1983, 64.

55) Hartman A. M, Block G. Dietary assessment methods for macronutrients. In: Micozzi MS, Moon TE, Eds. Macronutrients Investigating their Role in Cancer. New York Marcel Dekker, Inc. 1992; 87-124.

56) Block G. 1982. A review of validations of dietary assessment methods. Am J Epidemiol 115:492-505.

57) Gopalan C, B V Ramasastri, S C Balasubramaniam, Nutritive value of Indian Foods, Hyderabad, 2004.

Educational Technology: A Way To Enhance Student Achievement At The University Of Bahrain

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ABSTRACT

Educational Technology can empower teachers and learners, promote change and foster the development of twenty-first century skills. Improving education quality is a priority for most developing countries in which governments are facing a challenge to identify efficient ways to use their scarce resources and raise the quality of education. Data to support these beliefs are still limited, especially in the Kingdom of Bahrain and the other Gulf countries. Therefore, the current research aims to investigate the current situation regarding using Educational Technology at the University of Bahrain from the following aspects: the Educational Technology adopted by the university in the teaching and learning processes, obstacles facing the adoption of educational technology and the effects of Educational Technology on student achievement and academic staff teaching effectiveness. The results show that at the University of Bahrain, student learning and achievement have been affected when the teaching and learning processes are enhanced by Educational Technology. Educational Technology has motivated the students to get more involved in learning activities through which they become more active and more interested in learning. Moreover, the academic staff believe that adopting such technologies can enhance their communication with the students, reduce the teaching pressure caused by the course material preparation and make the lecture material available at the time of the discussion. However, the findings demonstrate some impediments facing both the students and instructors in adopting Educational Technology at the University of Bahrain, such as the insufficient ICT infrastructure and computing facilities, lack of sufficient technology budget and IT investment, and technical support.

Keywords: *Educational Technology, Enhance Student, Achievement, Bahrain*

INTRODUCTION

Education Technology is defined as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (Richey, 2008). Educational Technology can be used by all educators who want to incorporate technology in their teaching as well as educational administrators. The emergence of different educational tools and software has motivated may learning organizations to integrate them into the curriculum as they can have a great impact on student learning (Hawkins et al., 1996). Recently, Educational Technologies have been considered as a crucial factor in improving the quality of education and enhancing the level of student educational learning performance (Bialo and Sivin-Kachal, 1995). Educational Technology has demonstrated a significant positive effect on student achievement and the teaching and learning processes as a whole (Bialo and Sivin-Kachala, 1995).

The Kingdom of Bahrain has been the leader of educational progress within the region, establishing the Gulf's

first public education system in 1919 and giving its female population equal access to the Kingdom's educational resources (Bahrain Economic Development Board, 2011). In the Kingdom of Bahrain, a shift has taken place from teaching students how to use technology to focusing on using technology to support the delivery of the materials and content, as well as improving the learning outcomes of individuals as they seek to promote higher levels of motivation among students. The Ministry of Education works hard to improve the education process that the population goes through, and provides accessible, responsive, high quality education oriented services for the public. As such, a new Quality Assurance Authority for Education and Training (QAA) was launched in February 2009, which aims to raise the accreditation standards and inspections for the education system, and rank the performance of the system through regular national exams.

As the main part of the educational system in the Kingdom of Bahrain, the University of Bahrain, which is the only national learning organization, pays considerable attention to utilizing state-of-art technologies to facilities their own progress, particularly in the teaching and learning. For instance, Educational Technology has become increasingly commonplace in classrooms. All the classrooms are occupied by a data show device and a personnel computer to enable computer-based instructions. An open area lab consisting of more than 200 personnel computers is open to the students for the whole day to study and practice their learning material. In addition, there are four rooms in which a smart board is available for workshops for the students and the academic staff. Moreover, the University of Bahrain has made consistent progress in expanding Internet access in the instructional rooms. The Internet can be accessed by the students everywhere in the university through the Wireless network and the Wi-Fi. The University of Bahrain also established the E-Learning Centre in 2004 to provide high quality educational output that will contribute to producing a highly qualified generation. Moreover, the university has set a strategic plan to investigate new and more updated technology in the education process, such as teleconferencing, a collaborative environment for enhancing student team working, and social networking.

It is generally believed that technology can empower teachers and learners, promote change and foster the development of twenty-first century skills. Improving education quality is a priority for most developing countries in which governments are facing the challenge to identify efficient ways to use their scarce resources and raise the quality of education. Data to support these beliefs are still limited, especially in the Kingdom of Bahrain and the other Gulf countries. Therefore, this research aims to investigate the current situation regarding using Educational Technology at the University of Bahrain according to the following aspects: the Educational Technology adopted by the university in the teaching and learning processes, obstacles facing the adoption of educational technology and the effects of Educational Technology on student achievement and academic staff teaching effectiveness.

This paper consists of four sections; the next section highlights the research background. The research method and data collection are discussed in the third section. In the fourth section, the data analysis and results are discussed. The final section presents the conclusion of the study.

RESEARCH BACKGROUND

Educational Technology and Its Effect on the Teaching and Learning Processes

The definition of Educational Technology or Instructional Technology, as it is sometimes called (Earle, 2002), is difficult (Molerda, 2003). To define Educational Technology there is a need to distinguish between Educational Technology as a theory and as a field of practice and to focus on either the process or the system approaches (Molerda, 2003). Educational Technology has been defined as solutions to instructional problems that involve social as well as machine technologies with concern for improving the effectiveness and efficiency of learning in educational contexts (Cassidy, 1982, Gentry, 1995). Bruce and Levin (1997), however, perceive educational technology as a means of media with four different focuses: media for enquiry (for example, data modelling, spreadsheets, hypertext, etc.), media for communication (for example, e-mail, graphics software and simulations), media for construction (for example, robotics, CAD, control systems) and media for expression (for example, interactive video, animation software, music composition). Cox et al. (1999(2)) show that many educators perceive technology as a tool for improving the presentation of material for making lessons more fun for the learners and for making administration more efficient. According to the Association for Educational Communications and Technology (AECT) (2004), Educational Technology can be defined as "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources".

There is a widespread belief that Education Technology can enhance teaching and learning practices (Higgins, 2003), and create an "ideal" learning environment (Newhouse, 2002, Marshall, 2002, Honey and McMillan, 2005).

Hence, it becomes an integral part of both the teaching and learning process. Educational Technology can have the greatest impact on improving student learning and achieving measurable educational objectives (Nutball, 2000, Hawkins et al., 1996). In addition, it can empower teachers and learners, transforming teaching and learning processes from being highly teacher dominated to student centred (Higgins, 2003; Trucano, 2005). This transformation will increase the teaching gain for students and improve the quality of learning. Moreover, Educational Technology may provide students with valuable skills that are recommended by the market. Thus, such technology creates opportunities for learners to develop their creativity, developing cognitive skills, critical thinking skills, information reasoning skills, communication skills and other higher order thinking skills (Trucano, 2005, Means et al., 1994, Chigona and Chigona, 2010). Technology is a valuable tool that can help in the encouragement of collaborative learning as well as increase learner performance by effectively improving teaching and learning abilities (Chigona and Chigona, 2010, Means et al., 1994). It can also help learners to explore education beyond classrooms by providing access to a wide range of resources and information, promoting scientific inquiry and discovery and allowing students to communicate with experts (Means et al., 1994). According to Honey (1999), Educational Technology provides opportunities for problem solving and alignment with the curriculum framework and existing instructional resources, built-in assessments and procedures to match technology resources with learner needs, students their own control of pacing the educational programming and the involvement of teachers in the development of educational programmes. Bixler and Askov (1994) stated that effective technology empowers learners and helps them take responsibility for their own learning. Cradler and Bridgforth communicated the output of a forum wherein 70 US educational decision-makers and practitioners met, discussed and prioritized the benefits and issues related to educational networking. The conclusion was that networking technology is a powerful communications tool, which when utilized can support innovative teaching, encourage active learning, help relieve the professional isolation of teachers and can enable users to become active researchers and learners.

While there are strong beliefs that educational technology has a positive impact on the educational environment, some argue that it may be hard to shift from the traditional way of teaching to a technological one. Cost, culture and other educational and environmental factors are among the reasons for not adopting Educational Technology by many educational organizations and institutes.

The Effects of Educational Technology on Achievement and Performance of Students

Previous studies revealed the positive impact of technology on enhancing the achievement and performance of students and in gaining significant improvement and changes in all areas (Kulik and Kulik, 1991; Kulik, 1994; Rutz et al., 2003; Sivin-Kachla, 1998; Baker et al., 1994). For instance, many studies of the comprehensive effort to integrate technology into schools show an increase in test scores related to the use of technology. Kulik (1994) aggregated 500 individual research studies of computer based instruction students. The results of the aggregation demonstrated that students who used computer-based instruction scored better than those in the control condition without a computer. Students also gained more knowledge in less time because the classes became more enjoyable and interesting after the introduction of computers (Kulik, 1994).

Similarly, Sivin-Kachla (1998) found that students studying in a technology rich environment achieved higher marks in all subject areas, gained a positive attitude towards learning, were able to generate new ideas and built self-confidence. The US Department of Education conducted a scientific study in 2001 to assess the impact of technology using two types of student achievement measures – measure assessed reading achievement and assessed mathematics achievement. A significant impact was revealed in the students' scores. Moreover, in a study conducted in Pittsburgh, in which an intelligent tutor – software used to support the curriculum – was used as part of the regular curriculum for ninth-grade algebra (Koedinger et al., 1999). The results of the study demonstrated that 470 students in the experimental classes outperformed students in compression classes by 15% on a standardized test and 100% on test targeting the curriculum focused objectives (Koedinger et al., 1999). Moreover, in their evaluation of Apple Classrooms of Tomorrow (ACOT), Baker et al. (1994) conducted research in five schools across the nation to assess the impact of adopting interactive teaching and learning technology with an aim to encourage teachers to use computers to support student initiative projects and to assess multiple resources and cooperative learning. The research findings revealed that technology had a positive impact on the attitude of students towards learning. It also changed the teachers' teaching practices towards more cooperative group work and less lecturing load (Schater, 1999).

Recent studies conducted by Banerjee et al. (2005) and Barrow et al. (2009) revealed that adopting an instructional computer program can improve student achievement. Banerjee et al. (2005) found that by integrating the mathematics curriculum with educational technology, the mathematics scores of the fourth-grade students in Vadodara, India were increased. In addition, Barrow et al. (2009) analysed the effect of an instructional pre-algebra and algebra program on student's test scores in the US, while Rutz et al. (2003), examined the impact of using instructional technology on optimizing the learning styles and process types. They found that using web-based material to

supplement the in-class experience can improve student achievement. Murphy et al. (2001) found evidence of a positive relationship between using discrete educational software and student achievement in reading and mathematics.

Previous studies on the integration of the technology in education have tackled student achievement from a basic aspect, such as the scores, but have ignored many other aspects of student achievement and performance. Therefore, despite thousands of impact studies, the impact of technology used on student achievement remains difficult to measure and open to much reasonable debate (Trucano, 2005).

Factors That Affect the Adoption of Educational Technology in Teaching

Any activity mediated by technology will be influenced by many factors. A number of studies have shown that there are a wide range of factors that influence educators in adopting their teaching with technological tools (Cox et al., 1999, Mumtaz, 2000, Mansoon, 2000). Among these factors are the quality of the ICT resources, incentive to change (Cox et al., 1999, Mumtaz, 2000), instructor's readiness to adopt and use technology, instructor's confidence, knowledge and ability to evaluate the role of ICT in teaching and learning, technical support, students' acceptance and attitude to the use of IT, effective training and personal development (Mansoon, 2000), leadership and the availability of IT resources (Balash et al., 2011, Cushman et al., 2006; Choudrie et al., 2005; Frank et al., 2004 and Sherry et al., 2000). Peeraer et al. (2010) identified other factors that are related, especially to ICT, which include access to computers, intensity of computer use, ICT skills and ICT confidence. Means et al. (2001) mentioned that factors, such as lack of technology infrastructure, technical support and high quality digital content, can affect technology implementation in urban schools. Balsh et al. (2011) identified institutional support as one of the important factors to be considered in adopting Educational Technology. They discussed institutional support from the lack of policy and planning of using the educational technology and the lack of a reward system or appreciation reward for using such tools.

Factors that may influence the adoption of Educational Technology have been categorized into three groups: personal attitude, socio-cultural and environmental (Yaghi 1996, Chigona and Chigona, 2010). Factors such as socio-cultural and instructor's attitude towards using ICT have been considered by Snoeyink and Ertmer (2002) to have a vital impact on the adoption of educational technology. Naimova (2008) identified social factors, such as sex, age and socioeconomic status, while familiarity with computer and language were identified as critical items of the cultural factors. Muller (2007, 2008) considered the instructor's attitude towards computing important and argued that this factor is critical to the effectiveness of integrating ICT into the curriculum. If instructors are not comfortable with technology, then low expectations from technology can be perceived. Moreover, the confidence of the instructors in using educational technology will impact their attitude towards using ICT and indicate their level of engagement with ICT, and, therefore, will impact their decision to adopt the educational technology in their curriculum (Cox et al., 2003, Snoeyink and Ertmer, 2002). In addition to the attitude of the instructors, Naimova (2008) identified the attitude of administrators as one of the factors that may affect the adoption of Educational Technology. He argued that the lack of support from administrators may hinder the implementation of technology in the classroom. In most cases, the administrators believe that computers and other IT cannot be used by those who are not IT knowledgeable and skilled (Naimova (2008), Yaghi, 1996).

RESEARCH METHODOLOGY AND DATA COLLECTION

This research aims to investigate the current situation regarding the use and adoption of Educational Technology by the University of Bahrain. To achieve this purpose both survey and experiment were conducted. A random sample of 250 students and 100 academic staff from different colleges and departments were selected for the survey. In addition, an experiment was conducted with the help of 30 students from the Department of Information Systems to investigate the impact of different Educational Technologies on their performance. The students were asked to attend three lectures, which were conducted using the traditional technique (white board), PowerPoint and smart board. At the end of the lecture, the students were requested to complete a short questionnaire indicating their perception concerning the impact of the technology used in the lecture.

Data analysıs and results

Demographıcs

The demographic characteristics of the participants, both students and academic staff, are demonstrated in Table (1) and Table (2), respectively. The results in Table (1) show that the majority of the participating students were junior female (62%, 72%), Bahrainis (94%), and between 17 and 22 years old. Moreover, the results demonstrate that most of the participants were from the College of Business (36%) (The College of Business is considered to be the biggest college in the University of Bahrain in terms of number of students).

Table 1: Selected characteristics of the sample (students)

Demographic information	%	Demographic information	%
Gender		**College**	
Male	**28%**	**IT**	**16%**
Female	**72%**	**Science**	**10%**
Age		**Business**	**36%**
17-22	**95%**	**Engineering**	**9%**
23-28	**5%**	**Other**	**29%**
Nationality		**Class level**	
Bahraini	**94%**	**Freshman**	**36%**
Non-Bahraini	**5%**	**Junior**	**62%**
		Senior	**27%**

The results in Table (2), however, show that the majority of the academic staff that participated in the survey were female (54%), non-Bahrainis (56%), with an age range of between 36 and 50 (38%). In addition, the results show that most of the participants were from the College of Information Technology (38%) with experience of more than 15 years (42%).

Table 2: Selected characteristics of the sample (Academic staff)

Demographic information	%	Demographic information	%
Gender		**College**	
Male	**46%**	**IT**	**38%**
Female	**54%**	**Science**	**22%**
Age		**Business**	**22%**
23-35	**6%**	**Engineering**	**4%**
27-35	**28%**	**Other**	**14%**
36-50	**38%**	**Years of experience**	
Above 51	**28%**	**Less than 5**	**18%**
Nationality		**5 - 10 years**	**18%**
Bahraini	**44%**	**10-15 years**	**22%**
Non-Bahraini	**56%**	**More than 15**	**42%**

DESCRIPTIVE ANALYSIS

THE OVERALL ABILITY OF STUDENTS TO USE EDUCATIONAL TECHNOLOGY

The overall ability of the students to use technology at the University of Bahrain was investigated (Table 3). The results in Table (3) show that almost most of the students are able to use Educational Technology at the University of Bahrain. Thus, the results show that 46% of the participants are able to use Educational Technology without any assistance while 47% are able to use it with minimal assistance.

Table 3: The ability of students to use Educational Technology

Students' ability	%
Without assistance.	**46%**
Need minimal assistance when using technology.	**47%**
Need a lot of assistance when using technology.	**7%**
Never use technology.	**0%**

INTEGRATION OF EDUCATIONAL TECHNOLOGY IN TEACHING ACTIVITIES BY ACADEMIC STAFF

The frequency of integrating Educational Technology in teaching activities by academic staff was demonstrated and the results are demonstrated in Table (4). The results show that 44% of the participants are integrating Educational Technology in all of their courses, while only 2% never integrated Educational technology in their courses.

Table 4: Integrating Educational Technology in teaching activities

Educational Technology in teaching activities	%
Educational Technology is integrated in all of my courses.	**44%**
Educational Technology is integrated in most of my courses.	**28%**
Educational Technology is integrated in some of my courses.	**26%**
I never integrate Educational Technology in my teaching activities.	**2%**

IMPORTANCE OF COURSE REQUIREMENTS BEING AVAILABLE ONLINE

Both students and academic staff were asked regarding their perception concerning the importance of some of the course requirements to be available online. The results are shown in Figure (1). The results in Figure (1) reveal that both students and the academic staff believe that it is very important for lecture notes and students work (assignments and projects) to be available online (77% and 71%, respectively). However, there is a clear contradiction in their perception concerning the importance of the course grades, video archive of lectures, course syllabus, and class discussions.

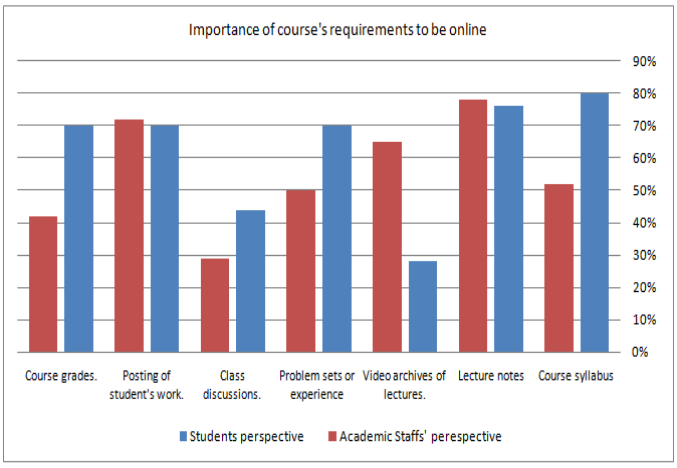

Figure 1: Perception of students and academic staff concerning the importance of course requirements being available online

PERCEPTION CONCERNING THE BARRIERS FOR IMPLEMENTING EDUCATIONAL TECHNOLOGY AT THE UNIVERSITY OF BAHRAIN

The perception of students and academic staff concerning the barriers for integrating Educational Technology in their learning and teaching activities was investigated. The results are shown in Table (5) and Table (6). The results in

Table (5) show that all students believe that the major barriers for integrating Educational Technology in their learning activities are the insufficient computing facilities (57%) followed by the difficulty of gaining access to the technical recourses in the University of Bahrain labs and classrooms (41%).

Table 5: Student perception concerning the barriers for integrating Educational Technology in their learning activities

Barriers	%
Insufficient computing facilities (labs, technology-equipped classrooms).	57%
Gaining access to the technical resources at the University of Bahrain is too difficult or inconvenient.	41%
Lack of assistance when facing technical problems.	40%
I'm not interested in using technology.	21%
Do not perceive any barriers.	9%

However, the results in Table (6) demonstrate that the insufficient computing facilities (64%) and the computing infrastructure (58%) are the most encountered barriers facing the academic staff in integrating Educational Technology in their teaching activities.

Table 6: Perception of academic staff concerning the barriers for integrating Educational Technology in their teaching activities

Barriers	%
Lack of time to integrate Educational Technology in teaching activities.	44%
Lack of funding to purchase the equipment and software needed.	32%
Insufficient computing infrastructure (servers, bandwidth, storage capacity).	58%
Insufficient computing facilities (labs, technology-equipped classrooms).	64%
Not enough training offered in the areas that interest you	32%
Not enough assistance with technical problems.	40%
Not interested in using technology.	2%
Do not perceive any barriers.	6%

THE EFFECT OF ADOPTING EDUCATIONAL TECHNOLOGY – PERSPECTIVE OF STUDENTS AND STAFF

As most of the students and academic staff at the University of Bahrain perceive the importance of Educational Technology, Table (3) and Table (4), the effect of these technologies should be investigated. Therefore, the perception of students and academic staff concerning the effect of Educational Technology on the overall performance of the students and instructor was investigated, as shown in Table (7) and Table (8), respectively.

Table 7: The effect of adopting Educational Technology – perspective of students

Effects	Disagree	Neutral	Agree
Increase academic achievements (e.g., grades).	18%	36%	46%
Encourages student's collaboration.	24%	33%	43%
Improves student's communication and interpersonal skills (e.g., ability to be a group member).	20%	25%	55%
Motivates the students to get more involved in learning activities.	20%	29%	51%

The results in Table (7) demonstrate that more than half of the participating students believe that Educational Technology can improve their communication and interpersonal skills (55%) and motivate them to get more involved in learning activities (51%). In addition, the results in Table (8) demonstrate that the majority of the participating academic

staff (> 70%) believe that Educational Technology can enhance the instructor's communication skills (74%), increase the competency among other academic staff (74%) and reduce the pressure of the lecture preparation on the instructor (72%).

Table 8: The effect of adopting Educational Technology on student performance – perspective of academic staff

Effects	Disagree	Neutral	Agree
Enhance their communication skills.	**8%**	**18%**	**74%**
Increase the competency among other academic staff.	**8%**	**18%**	**74%**
Give the teachers the opportunity to be learning facilitators instead of information providers.	**22%**	**40%**	**38%**
Reduce the pressure of the lecture preparation on the instructor.	**14%**	**14%**	**72%**
Destroy student's social development.	**48%**	**32%**	**20%**

EXPERIMENT ANALYSIS AND RESULTS

In section 3, it was mentioned that two of the adopted Educational Technologies in the University of Bahrain were selected: smart board and power point. They were compared with the traditional way of teaching using a whiteboard. The comparison was done to examine the perception of the students on the adoption of such technologies as a teaching tool, the effect of these technologies on their communication skills, performance and understanding, as shown in Table (9), Table (10) and Table (11).

PERCEPTION OF STUDENTS CONCERNING THE ADOPTION OF POWERPOINT, SMART BOARDS AND WHITEBOARD AS TEACHING TOOLS

The results in Table (9) indicate that the smart board is the most enjoyable technology (70%) whereas PowerPoint is the most boring technology to be used (80%). Moreover, the respondents believe that PowerPoint and whiteboard can make the lecture material easy to follow (40%, 40%, respectively) while they require extensive note taking (30% and 70%). In addition, PowerPoint is perceived by the participants to be a teaching technology that does not allow enough participation in the lecture (65%).

Table 9: Perception of students concerning adopting PowerPoint, smart board and whiteboard as teaching tools

Description	Power Point	Smart Board	White board
Enjoyable	**20%**	**70%**	**10%**
Easy to follow.	**40%**	**20%**	**40%**
Boring	**80%**	**10%**	**10%**
Does not allow enough participation.	**65%**	**0%**	**35%**
Required extensive note taking.	**30%**	**0%**	**70%**

PERCEPTION OF STUDENTS CONCERNING THE EFFECT OF USING POWERPOINT, SMART BOARDS AND WHITEBOARD ON THEIR COMMUNICATION SKILLS

The results in Table (10) demonstrate that students believe that both PowerPoint and whiteboard decrease the communication between the instructor and the students (50%, 40%, respectively) while the smart board increases the interaction among the students (80%) and enhances the ability of students to work in a group (65.5%).

Table 10: Perception of students concerning the effect of PowerPoint, smart Board and whiteboard on their communication skills

Effect	Power Point	Smart Board	White board
Make the content and delivered materials of the lectures more clear	**35%**	**40%**	**25%**
Helps the students to remember the information easily.	**50%**	**50%**	**50%**
Increases the student's attention by limiting any disruption opportunities.	**40%**	**40%**	**20%**

PERCEPTION OF STUDENTS CONCERNING THE EFFECT OF USING POWERPOINT, SMART BOARDS AND WHITEBOARD ON THEIR PERFORMANCE AND UNDERSTANDING

The results in Table (11) demonstrate that more than 30% of the participating students believe that smart boards and PowerPoint can make the content and the delivered materials of the lectures more clear by offering images, colours and many other features. Moreover, they can increase the attention of students by limiting any opportunities for disruption (40%, 40%, respectively)

Table 11: Perception of students concerning the effect of PowerPoint, smart board and whiteboard on their performance and understanding

Effect	Power Point	Smart Board	White board
Decreases the communication between the instructor and the students.	**50%**	**10%**	**40%**
Increases the interaction between students.	**5%**	**80%**	**15%**
Enhances the students' ability to work in a group	**25%**	**65.5%**	**9.5%**

DISCUSSION AND CONCLUSION

The current study was conducted to investigate the effect of using Educational Technology on the achievement and performance of students at the University of Bahrain. It has been revealed by the results that at the University of Bahrain the learning achievement of students is affected when the teaching and learning processes are enhanced by Educational Technology. It motivates the students to become more involved, active and interested in learning. In addition, Educational Technology promotes the collaborative communication and interpersonal skills of students, and, consequently, changes their attitude to learning. The experiment has demonstrated that effective technology, such as smart board and PowerPoint are very enjoyable, help in best utilizing the lecture time, limit disruption by students, provide outstanding methods for presenting the lecture materials, and enhance the concentration and engagement of the students.

Most of the academic staff and instructors at University of Bahrain are integrating their teaching with Educational Technology due to its easy access and availability. They are mostly using Moodle, LMS (Black board), PowerPoint and some collaborative tools, such as Microsoft Groove and Dropbox, as a teaching assistance technology. The academic staff and instructors realize that adopting such technologies can enhance their communication with the students, reduce the teaching pressure caused by the course material preparation and make the lecture material available at the time of the discussion. The integration with Educational Technology will enable them to build teaching competencies, and, therefore, will impact their teaching effectiveness and performance.

Although, the importance of Education Technology has been acknowledged by the University of Bahrain, there are some impediments facing both the students and instructors in adopting Educational Technology. The insufficient computing facilities and infrastructure, lack of sufficient technology budget and IT investment, technical support and excessive budgeting and resources consumption needed for training programmes are among the obstacles facing the university in adopting Educational Technology.

The results of the current study have established the positive impact of Educational Technology in enhancing the performance of the students and the overall teaching and learning processes that have already been proved by many studies (Rutz et al., 2003, Koedinger, 1999, Baker et al., 1999, Sivin Kachla, 1998). However, educational organizations should be aware that the achievement of their learning effectiveness and desired outcomes will not be achieved just by purchasing updated software and hardware (John and Sutherland, 2005, Peeraer, et al., 2010). Educational Technologies can be found to be less effective and even inefficient teaching supportive tools if adopted without appropriate alignment with the nature of the course, course objectives and learning outcomes, lecture type and material, students learning styles and teaching styles (Balash, et al., 2011, Trucano, 2005). Therefore, before taking a decision to adopt certain Educational Technology, the educational organizations need to develop strategic planning in which their vision and mission, together with the teaching and learning processes needs, should be identified and embedded in their strategy (Balash et al., 2011). Moreover, the internal and external environment need to be assessed to identify those factors that assist in achieving their objectives and goals for adopting Educational Technology as well as the barriers and obstacles for their achievement.

REFERENCES

Association for Education Communication and Technology (AECT) (2004), "The definition of Educational Technology", Definition and Terminology Committee, June

Bahrain Economic Development Board (2011), Education and training Available, http://www.bahrainedb.com/education-training.aspx (last visited 6/11/2011)

Baker, E. L. (1999), "Technology: How do we know it works?", Secretary's Conference on Educational Technology, Retrieved May 14, 2002 from http://www.ed.gov/rschstat/eval/tech/techconf99/whitepapers/paper5.html.

Baker, E.I., Gearhart, M, and Herman, J. L. (1994), "Evaluating the apple classrooms of Tomorrow", in E.L. Baker and H.F. O'Neil, Jr. Technology assessment in education and training. Hillsdale, NJ: Lawrence Erlbaum.

Balash, Farhad, Yong, Zhang and Bin Abu, Bahrain (2011)," Lecturers and educational technology: Factors affecting educational technology adoption in teaching", 2nd International Conference on Education and Management Technology IPCSIT, Vol. 13, Singapore

Banerjee, A., Cole, S., Duflo, E. and Linden, L (2005), "Remedying education: Evidence from two randomized experiments in India", working paper, Cambridge, MA: National Bureau of Economic research.

Barrow, L. Markman, L. and Rouse, C. (2009), "Technology's Edge: the educational benefits of computer-Aided Instruction", The American Economic Journal: Economic Policy, Vol. 1, pp. 52-74

Bialo, E. R. and Sivin-Kachala, J.(1995) Report on the Effectiveness of Technology in Schools, 95–96. Washington, D.C.: Software Publishers Assn.

Bixler, B. and Askov, E.N. (1994), "Characteristics of Effective Instructional Technology", Mosaic: Research Notes on Literacy, Vol.4, Issue 2.

Bruce, B.C., and Levin, J.A. (1997), "Educational technology: Media for inquiry, communication, construction, and expression", Journal of Educational Computing Research, Vol. 17, Issue 1, pp. 79-102.[online]. Available at http://www.lis.uiuc.edu/~chip/pubs/taxonomy/index.html

Cassidy, M. F, (1982), "Toward integration: Education, instructional technology, and semiotics", Educational Communications and Technology Journal, Vol. 20, issue (2), pp. 75–89.

Chigona, Agnes and Chigona, Wallace (2010), "An investigation of factors affecting the use of ICT for teaching in Western Cape Town", the 18th European Conference on Information System-ECIS 2010 proceeding, Paper 6

Choudrie, J and Dwivedi, YK (2005)," Investigating the research approaches for examining technology adoption issues", JRes Pract, Vol. 1, Issue 1, pp. 1–12

Cox, M. and Cox, K. (1999), "What motivate teacher to use ICT?", paper presented at the British Research Association Conference, Brighton, September.

Cox, M., Webb, M., Abbott, C., Blakeley, B., Beauchamp, T., and Rhades, V. (2003), ICT and Pedagogy: a review of the research literature, London, BECTA/DFES

Cradler, J. & Bridgforth, E. (1998). Recent research on the effect of technology on teaching and learning for west laboratory USA (online), retrieved December 23rd, 2010, from http://www.wested.org/techpolicy/research.html

Cushman, M. and Klecun, E. (2006)," How (Can) non-users engage with technology: bringing in the digitally excluded", In: Trauth E, Howcroft D, Butler T, Fitzgerald B, Gross JD (Eds) Social inclusion: societal and organizational implications for information systems. Springer, Boston. 2006, pp 347–364

Earle, Rodney (2002), "The integration of instructional technology into public education: promises and challenges", ET Magazine, Vol. 42, No. 1, pp. 5-13, bookstoread.com/etp

Frank, KA, Zhao, Y., Borman, Y (2004)," Social capital and the diffusion of innovations within organizations: application to the implementation of computer technology in schools", Social Education, Vol. 77, pp. 148–171

Gentry, C. G., (1995), "Educational technology: A question of meaning". In G. Anglin (Ed.), Instructional technology: Past, present, and future, Englewood, CO: Libraries Unlimited.

Hawkins, J., Panush, E. and Spielvogel, R. (1996), National study tour of district technology integration (summary report), New York: Center for Children and Technology, Education Development Center

Higgins, S. (2003), Partez-Vous Mathematics? In Enhancing primary mathematics teaching and learning, Thompson, I, Buckingham: Open University press.

Honey, M., Culp, K.M., and Carrigg, F. (1999), "Perspectives on technology and education research: Lessons from the past and present", [online]. Available: http://www.ed.gov/Technology/TechConf/1999/whitepapers/paper1.html

Honey, Margaret and McMillan, Katharine (2005), "Critical issues: using technology to improve student achievement", North Centrel regional educational laboratory, www.ncrel.org

Koedinger, K. and Anderson, J (1999), PUMP algebra project: AI and high school math, Pittsburgh, PA: Carnegie Mellon University, Human-Computer Interaction institute, http://act.psy.cmu.edu/awpt/awpt-home.html

Kulik, C.C. and Kulik, J.A. (1991), “effectiveness of computer-based instruction: An updated analysis”, Computers in Human Behavior, Vol. 7, pp. 75-94

Kulik, J. A. (1994), “Meta analytic studies of findings on computer-based instruction”, in Baker and H. O’KNeil, Technology Assessment in Education and Training, Hillsdale, NJ: Erlbaum.

Kulik, J.A.(1994), "Meta - analysis studies of findings on computer-based instruction", in E.L. Baker, and H.F. O'Neil, Jr.(Eds), Technology assessment in education and training. Hillsdale,NJ: Lawrence Erlbaum.

Mansoon, C. (2000), "Schools with a future: a model for IT investment effectiveness", paper presented at ACEC 2000 Conference, Melbourne

Marshall, D. (2002), Learning with Technology: Evidence that technology can and does support learning, San Diego CA: Cable in classroom.

Means, B. (1994), " Introduction: Using technology to advance educational goals", In B. Means (Ed).), Technology and education reform: The reality behind the promise (pp. 1-21). San Francisco, CA: Jossey-Bass.

Means, B. Penuel, W., Padilla, C.(2001), The connected school: Technology and learning in high school, San Francisco, CA: Jossey-Bass.

Mueller, J., Sancho, J., Hernandez, F., Giro, X. and Bosco, A. (2007). “the Socio-Economic Dimensions of ICT-Drive educational change”, Computers and Education, Vol. 49, Issue 4, pp. 1175-1188

Mueller, J., Wood, E., Willoughby, T., Ross, C. and Specht, J. (2008). “Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration”, Computers and Education, Vol. 51, Issue 4, pp. 1523-1537.

Mumtaz, S. (2000), "Factors affecting teachers' use of information and communications technology: a review of the literature", Journal of Information Technology for Teacher, Vol (9), Issue 3, pp. 319-24.3

Mumtaz, S. (2000), "Using ICT in schools: a review of the literature on learning, Teaching and software evaluation, Warwick, UK: Institute of Education.

Murphy, R., Penuel, W., Means, B., Korbak, C. and Whaley, A (2001), E-DESK: A Review of recent evidence on the effectiveness of discrete Educational Software, Menlo Park, CA: SRI International.

Naimova, Veronica (2008), Factors affecting the implementation of instructional technology in the Second Language classroom, M.Sc. dissertation, Brigham Young University, UK

Nutball, Keith (2000), "Strategies for improving Academic Achievement and teaching effectiveness: education development center", NEIRTEC, www.neirtec.org

Peeraer, J. and Van Petegem, P. (2010), "Factors Influencing Integration of ICT in Higher Education in Vietnam", In Z. Abas et al. (Eds.), Proceedings of Global Learn Asia Pacific 2010, pp. 916-924

Phillips, Rob (2005), "Pedagogical, institutional and human factors influencing the widespread adoption of educational technology in higher education", Mendeley, Vol. 99, Issue 10, pp. 541-549

Richey, R.C. (2008), "Reflections on the 2008 AECT Definitions of the Field", TechTrends, Vol. 52, Issue 1, pp. 24-25

Rutz, Eugene; Eckart, Roy; Wade, James; Maltbie, Virginia (2003), "Student performance and acceptance of instructional teaching: Comparing technology- enhanced and traditional instruction for a course in STATICS", Journal of Engineering Educational, Vol. 92, Issue 2

Schacter, John (1999), "The impact of educational technology on students achievement: what the most current research has to say", ERIC, ed430537, Milken Exchange on education Technology

Sherry, L., Billig, S., Tavalin, F. and D. Gibson, D. (2000)," New insights on technology adoption in schools", T.H.E. Journal, Vol. 27, Issue 7, pp.43–46

Sivin-Kachala, J.(1998), Report in the effectiveness of technology in school, 1990-1997. Software Publisher's Association U.S. Congress, Office of Technology Assessment, Power On! New Tools for Teaching and Learning, OTA-SET-379 (Washington, D.C.: U.S. GPO, Sept. 1988).

Snoeyink, R ,. Ertmer, P. A. (2002),"Thrust into technology: How veteran teachers respond", Journal of Educational Technology Systems, Vol. (3), Issue 1, pp. 85-111.

Trucano, Michael (2005), Knowledge maps: ICTs in educations, Washington, DC: InfoDev/WorldBank

Yaghi, H. (1996), "The Role of the Computer in the School as Perceived by Computer Using Teachers and School Administrators." Journal of Educational Computing and Research, Vol. 15, Issue 2, pp. 137–149