Assist. Prof. Dr. Mustafa Caner, Akdeniz University, Turkey
Assist. Prof. Dr. Katherine Sinitsa, International Research and Training Center, Ukrania
Assist. Prof. Dr. Roxana Criu, Cuza University, Romania
Assist. Prof. Dr. Zdena Lustigova, Charles University, Czech Republic
Dr. Hisham Mobaideen, Mu'tah University, Jordan
Dr. Simon Stobart, University of Teesside, United Kingdom
Dear WJEIS Readers,

WJEIS appears on your screen now as Volume 6, Number 1. In this issue it publishes 10 articles.

Colleagues that are in editorial board worked hard to determine the articles of this issue. There are also some articles that were presented in “6th International Conference on New Trends in Education and Their Implications - ICONTE, 24-26 April, 2015” with the contribution of 22 countries. Articles are evaluated by the referees that are either in editorial board or outside the board.

Although WJEIS is a new journal, it has been welcomed with interest. A lot of journals from various universities are in the evaluation process. We would like to thank cordially our colleagues who work hard in editorial board to evaluate the articles, writers who contribute to our journal and all readers.

1st February, 2016

Best regards

Prof. Dr. Zeki Kaya
Prof. Dr. Ugur Demiray
Assoc. Prof. Dr. Murat Hismanoglu
01. AN EXPLORATORY QUALITATIVE STUDY ON ENGLISH LANGUAGE INSTRUCTION IN A THAI UNIVERSITY
Watcharaphong Soongpankhao - THAILAND

02. METAPHORS ABOUT MATHEMATICS OF INDUSTRIAL VOCATIONAL HIGH SCHOOL STUDENTS
Fatma Sevindik, Assoc. Prof. Dilek Sezgin Memnun, Dr. Selin Çenberci – TURKEY

03. CONCEPTUAL UNDERSTANDINGS OF SEVENTH GRADE GIFTED STUDENTS REGARDING SEVERAL SITUATIONS INVOLVING CHEMICAL CHANGES
Res. Assist. Handan Ürek, Assist. Prof. Dr. Gamze Dolu - TURKEY

04. FLIPPING THE DRAWBACKS OF FLIPPED CLASSROOM: EFFECTIVE TOOLS AND RECOMMENDATIONS
Betül Aydın, Veysel Demirer - TURKEY

05. TEACHERS’ OPINIONS ON THE INFORMATION TECHNOLOGY COURSE AND INFORMATION TECHNOLOGY TEACHER
Alper Aslan, İdris Göksu, Assoc. Prof. Dr. Bünyamin Atıcı - TURKEY

06. THE ADVANTAGES AND DISADVANTAGES OF BLOCK SCHEDULING AS PERCEIVED BY MIDDLE SCHOOL STUDENTS
PhDc. Suat Kaya, Prof. Dr. Meral Aksu - TURKEY

07. THE POTENTIAL BENEFITS OF PODCASTS FOR LANGUAGE LEARNING
Assist. Prof. Dr. Ismail Yaman - TURKEY

08. ENHANCING STUDENT CRITICAL AND ANALYTICAL THINKING SKILLS AT A HIGHER EDUCATION LEVEL IN DEVELOPING COUNTRIES: CASE STUDY OF THE BRITISH UNIVERSITY IN DUBAI
Assist. Prof. Dr. Hanan M. Taleb, Prof. Dr. Clifton Chadwick - UNITED ARAB EMIRATES

09. THE EFFECT OF COMPTON SCATTERING TEACHING BASED ON HOT CONCEPTUAL CHANGE ON STUDENTS’ CONCEPTUAL CHANGE
Assoc. Prof. Dr. M. Sabri Kocakülah, Dr. Mehmet Kural - TURKEY

10. THE OPINIONS OF GEOGRAPHY TEACHER CANDIDATES AND GEOGRAPHERS TOWARDS ONLINE LEARNING
Assist. Prof. Dr. Emine Teyfur - TURKEY
AN EXPLORATORY QUALITATIVE STUDY ON ENGLISH LANGUAGE INSTRUCTION IN A THAI UNIVERSITY

Watcharaphong Soongpankhao

Faculty of Liberal Arts
Rajamangala University of Technology Phra Nakorn
Bangkok- THAILAND
watcharaphong.s@rmutp.ac.th

Abstract
This qualitative case study investigated how local Thai teachers identified, classified, and corrected mistakes the students made and how the teachers dealt with those mistakes that would reflect and correspond to their teaching situations in the so-called EFL classroom. Specifically, this study explored EFL teaching in a provincial university in Thailand. It focused on 6 Thai EFL teachers, selected through a typical sampling. Data was collected through in-depth interviews. The interview protocol consisted of four general domains: the pedagogy, teaching materials, evaluation, and general points of view toward EFL teaching in Thailand. Salient findings revealed that English education required dedicated efforts from the teachers and learners. Teachers played the roles of input providers, mistake correctors, and coaches simultaneously. Dealing with the participants' challenges in classroom, each teacher employed individualized techniques using his/her knowledge and experiences.

Keywords: Thai EFL; teachers' multiple roles; teaching challenges.

INTRODUCTION

Learning and teaching second language involves efforts of both teachers and learners. Issues relevant to second language teaching and learning are voluminous. Given that this study aims to investigate how teachers identify, classify, and correct mistakes the students produce, the review covers only certain aspects, including SLA theories, English language teaching methods, teachers' beliefs, and previous studies.

Previous studies
In 1998, Borg conducted his qualitative research on teachers’ pedagogical systems and grammar teaching in an English language institute in Malta, a Mediterranean centre for TEFL. His study aimed to explore the nature of the pedagogical systems L2 teachers utilize in determining the role and nature of grammar teaching in their classroom practice. The data came from pre-observation interviews with a male native speaker of English with over 15 years experience being involved in TEFL and 15 hours of his classroom observations.

His data were organized around the teaching behaviors concerning grammar work. There were five strategies that the teacher used for working with grammar: analyzing students’ grammatical errors, encouraging students to refer to their L1: using explicit discussions of grammatical issues: eliciting the grammar rules through the class interactions, and using practice activities. The participant also revealed that there were conflicts about varieties of teaching and learning issues. Although he believed that traditional grammar teaching probably does not enhance students’ communicative ability, he employed such approach for some reasons. For instance, it makes students aware of grammatical errors as well as enhances students’ self-correction. It should be noted that, according to Borg’s study, the external forces (e.g., the school society, parents, classroom and school layout) did not appear to interfere with the participant’s pedagogical system. However, he was influenced by internal factors or the course of instruction itself.
When it comes to the EFL teaching of Thai context, the beliefs of Thai EFL teachers have been reviewed. Kantapat (2003) examined beliefs of two Thai male teachers of English language toward their career and the method of teaching English in their classroom. The participants were both male from different universities. Teacher A has been teaching English for over ten years and Teacher B has over six years of teaching experience. The semi-structured interview approach was adapted in this study. The responses of each participant were categorized into major themes which are 1) becoming an English language teacher, 2) being an English language teacher, 3) beliefs about teaching methods/teaching effectiveness, 4) becoming a dedicated teacher, and 5) looking into the future: five year ahead. The results show that the participants were satisfied with their careers. They were well prepared and qualified for the career as teachers of English. Although different methods were believed to be suitable the most for their students, they shared the same objective in teaching of English. They were aware of the current theories of SLA in their teaching.

Dujduen (2007) explored pedagogical knowledge of Thai EFL teachers concerning its consistency with the existing theories/hypotheses of SLA. Semi-structured interviews with six English reading for Academic Purposes teachers are analyzed using selected SLA theories as a framework. As for the results, five salient themes emerged from the interview data: 1) explicit grammar instruction; 2) source of materials; 3) L1 use in reading classroom; 4) roles of teacher and students; 5) perceived effective EFL teaching. The first four themes concern the participants’ teaching experiences in reading classes and the last theme is related to their opinions on effective EFL teaching. The results indicated that teachers’ pedagogical knowledge is compatible with certain SLA theories and hypotheses. It also revealed that participants’ styles of teaching cannot be neatly classified into the two common dichotomies: the traditional versus communicative methods, and focus on formS versus focus on form instructions.

Based on the literature review described above, it appears that more research should be conducted that investigates how Thai teachers of English at a teachers college outside of Bangkok have come to understand challenges and opportunities inherent in their teaching profession. The context of situation they were in should inform current SLA theories, especially those that deal with instructed SLA. This study represents the development in that direction.

To achieve the purposes mentioned above, a research question is addressed:
1. What challenges do the participants have in teaching English?
2. How do they deal with their challenges?

METHODOLOGY

As mentioned in the previous section, this study was designed to explore how Thai EFL teachers deal with their teaching situations. The questions explored in this research center around the challenges the participants face in the EFL classrooms and how they deal with such challenges. The questions beg for specific types of data. As known to all researchers, different types of data require different methods of collection. This study investigates what challenges the participants involved in the EFL class encounter; the most suitable type of data is definitely the one which the researcher has to elicit from the participants. Challenges vary from one person another. Each person encounters different difficulties and the difficulties do not lend themselves easily to simple observation. One simply has to elicit them from the informants. Although elicitation can be done in many ways, the most appropriate for the current study is an in-dept interview based on semi-structure questions designed beforehand. However, the in-dept interview led me to several questions that I’ve never thought of before. The procedure in gathering the data in this study is provided in the following sections.

Research Site

The research was conducted at Kamphaengphet Rajabhat University, Kamphaengphet, Thailand. Because the study was intended to be qualitative in nature without any aims of proposing any generalization, the in-depth interview of teachers was employed. The nature of questions required only answers from a few informants selected by the process of purposive sampling. I conducted 6 semi-structured interviews with 6 EFL teachers.
All were EFL teachers who have been teaching English in various courses at the selected university. Three of the informants were female and three were male. The years of teaching experience range from 2 to 20. The table below shows each informant’s backgrounds.

Table 1: Pseudonym and Demographic Information of the Interviewees

<table>
<thead>
<tr>
<th>Participants</th>
<th>Gender</th>
<th>Years of teaching experience</th>
<th>Class taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teacher A</td>
<td>Male</td>
<td>8</td>
<td>Academic Writing</td>
</tr>
<tr>
<td>2. Teacher B</td>
<td>Female</td>
<td>20</td>
<td>Business English</td>
</tr>
<tr>
<td>3. Teacher C</td>
<td>Female</td>
<td>2</td>
<td>English for Research</td>
</tr>
<tr>
<td>4. Teacher D</td>
<td>Male</td>
<td>11</td>
<td>Linguistics</td>
</tr>
<tr>
<td>5. Teacher E</td>
<td>Female</td>
<td>7</td>
<td>English for communication and study skill</td>
</tr>
<tr>
<td>6. Teacher F</td>
<td>Male</td>
<td>3</td>
<td>Grammar writing</td>
</tr>
</tbody>
</table>

**Questions**

As stated above, the semi-structured interview was used in face-to-face interviews in order to allow the researcher to acquire in-depth information. To achieve the purposes of this study, 18 open-ended questions were employed. The interview questions consisted of four general domains: the pedagogy, teaching material, evaluation, and points of view toward EFL teaching in Thailand. The informants were asked what problems they faced in the EFL class and how they dealt with such situations. The actual questions can be found in Appendix 1.

**Data Analysis**

After the interviews were conducted, they were transcribed. However, the transcripts were not translated word by word. The answers were classified and the information was presented in the form of a table so as to make it easy to understand.

In this study, selected Second Language Acquisition theories, as described in the previous section, were used as the theoretical frameworks to make sense of the data. The results are discussed in the next section.

**FINDING AND DISCUSSION**

As stated in the last chapter, the semi-structured interview was employed to obtain the data. This chapter focuses on data analysis. As can be seen in the methodology chapter, 18 questions were asked in this study (Appendix 1). Each interview question was designed to cover a different domain. That is, questions 1 to 6 were asked to elicit the answer regarding pedagogy. Questions 7 - 11, on the other hand, led to answers related to teaching materials used by each informant. As far as the domain of evaluation is concerned, questions 12-14 were created to induce relevant answers. Finally, questions 15 – 18 elicited information regarding the point of views the informants have toward the EFL teaching in the Thai context. The domains stated can be summarized as follows.
Table 2: Summary of questions in relation to each domain

<table>
<thead>
<tr>
<th>Q</th>
<th>Question Contents</th>
<th>Domain Related</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What are the main problems found in class?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>How do you deal with such problems?</td>
<td>Pedagogy</td>
</tr>
<tr>
<td>3</td>
<td>If you could choose, what kind of students would you like to teach?</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Do you emphasize grammar teaching?</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Do you teach the pronunciation?</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Do you use the integrated approach?</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Which language has been used in teaching?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Do you use your own book or commercial text?</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Did you teach all chapters?</td>
<td>Teaching material</td>
</tr>
<tr>
<td>10</td>
<td>Do you have extra handouts/materials for your students?</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Were your students forced to read the extra reading?</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Did you write the exam question yourself?</td>
<td>Evaluation</td>
</tr>
<tr>
<td>13</td>
<td>What is your exam format?</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>When evaluating your students, would you test them all skills?</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Why Thai children have low English proficiency score?</td>
<td>Points of view toward EFL teaching in Thailand</td>
</tr>
<tr>
<td>16</td>
<td>When is the most appropriate period for a child in acquiring the additional language?</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>The effective English teacher should be Thai of native speaker?</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Should English be mandatory for Thai students?</td>
<td></td>
</tr>
</tbody>
</table>

The first three domains concern the informants’ teaching experiences in their classes and the last domain is related to their opinions toward the EFL teaching in the Thai context. I begin with pedagogy.

**Pedagogy**

According to questions 1 and 2, the informants were asked the question, “what are the problems found in class?” and “How do you deal with such problems?” The answers to question 1 emerged into four themes which were a) low English proficiency score (N=5), b) narrow vocabulary (N=3), c) the low motivation (N=1), and d) inappropriate course syllabus. The answers to question 2 can be seen in three salient themes; a) contributing classroom activities (N=3), b) review basic grammar all over again (N=3) and, c) using sarcastic strategy to increase students’ motivation.

According to the answers, low proficiency score encompasses low proficiency in all basic skills. The informants stated that when students performed poorly, they performed poorly in all basic skills. That is, when their vocabulary is not good, their listening, speaking, reading, and writing scores are all low.

Teachers A, C and F stated that their students did not possess enough vocabulary. Often times, they were asked about the meaning of the basic vocabulary but they could not give correct translation. As such, they failed to write well. Misspelling seemed to be the most obvious indicator of not having adequate vocabulary. In addition, certain inappropriate words were used. For example, a word used in an informal situation was used in a piece of writing which required formality. Teacher A, for example, provided a comment on the poor proficiency score as follows,

“The students understand what I say and understand the assignment but when it comes to verbal communication in classroom, they have difficulties expressing ideas they would like to share in English. This inability can result from their anxiety. For example, a word used in an informal situation was used in a writing
which required formality. As far as reading is concerned, they are able to read and write. But their writing is below the advanced level. Even when they know the format, they simply cannot write because they have no adequate vocabulary. For example, when assigned to write an academic abstract, they cannot do it despite the fact that an example is provided.”

From the quote above, one can readily see that the teachers are well aware of the problems. They also know the causes (whether they are the real causes or not). What is important is whether the situation is rectified. Knowing (guessing) the causes is no use if the teachers do not try to fix them. It should be interesting to see if the teacher attempts to do something to lessen the level of anxiety which they believe to be the root of all the problems identified.

As the results, in order to solve the problems, some teachers (N=3) employ classroom activities, such as role-plays and presentations, to improve the proficiency score of their students, to reduce the anxiety of the students in class, and to expand the vocabulary. Teacher E stated that “The students were assigned to make presentations in front of the class. I found that they were more active and enjoyed the class activity more than the actual lecture from the teacher. Activities such as this force them to speak English; whether they spoke correctly in terms of grammar or not, they performed the activity without any kind of evaluation or correction from the teacher.” Some teachers (N=3) solve the problem by reviewing the basic grammar of which they feel their students lack the knowledge. For example, Teacher B said “…sometimes it’s very difficult to teach them the new lesson because they cannot recall the basic grammar rules to facilitate the given chapter. What I can do is just stop following the syllabus and review it all over again”

There are instances of some informants having different problems. Teacher D for instance, asserted that the main problems he often found were the low motivation and the inappropriate course syllabus. This informant recalled that

“I found that the students with low motivation majoring in English did not take the entrance examination. They were not tested on their English proficiency when applying to the university. Later on, they found that majoring in English was not their preference. On the other hand, some students have high motivation but they still have low proficiency scores. Another problem is the inappropriate course syllabus. The basic courses are not offered at the beginning of the semester. For example, instead of teaching phonetics in the first semester, the phonetics course appears later in the undergraduate program.”

In this study motivation is defined as “the effort learners put into learning an L2 as a result of their desire or need to learn it.” As for the general assumption of the relationship between motivation and L2 learning, it is widely believed that a highly motivated learner learns faster and is more successful. According to Teacher D, the problem he found can be the evident showing that lowly motivated students stop developing their L2 learning. In contrast, most students who have high motivation, with low English proficiency scores, facilitate learning activities in L2 classroom. The teacher solves the problems by using sarcastic remarks to motivate his students. He said “I am not a good motivation booster but I often use sarcastic remarks to heighten their motivation. I emphasize their weaknesses and tell them that they have to develop their English proficiency which is lower than the desired standard of undergrad students”.

Such a problem may result from the entrance policy of the university. There is no testing process in order to recruit the candidate who wants to be the English major student. To him, he feels uncomfortable teaching the inappropriate syllabus designed by the faculty. He believes that the basic linguistics courses, such as phonetics, should be taught to students at the beginning of the study program. These might be the factors that we should take into consideration when it comes to the success and failure in L2 acquisition.

As far as the preferences of the informants are concerned, they were asked to choose, if they could, between teaching the high and the low English proficiency students (Question 3). According to the data, five informants (N=5) expressed interests in teaching the high proficiency students and only one informant (N=1) chose the low proficiency learners. All informants who would like to teach high proficiency students argued that teaching clever students facilitated their self-learning process when preparing the lessons for their students. They have
to be well prepared when they have to teach such the students. Some informants felt that they enjoyed teaching the communicative classes when the communication flowed between both parties (teacher and learners). Teacher A said “If I could choose, I’d like to teach the high proficiency students because we can make it two-way communication and they respond to every questions I ask. It contributes a good environment in the language classroom.”

As for Teacher B, however, she prefers teaching low proficiency students. She stated that she would consider herself successful if her students showed signs of development.

Questions 4 – 7 were designed to elicit the answers regarding the teaching methods and approaches the informants use in their classes. That is, do you emphasize grammar teaching? If so, how do you teach grammar? If not, why? (question 4). Question 5 was “Do you teach the pronunciation?” Question 6 aimed at asking whether or not they used the integrated approach. And question 7 was “Which language has been used in teaching English?

According to the data, all informants (N=6) shared the same perception that grammar should be taught. Two, however, stated that grammar should be taught only when teaching writing (Teachers E and F). These two therefore teach grammar only in their composition classes. In classes of which the objective is communication, these two teachers agreed that grammar was not necessary. Students’ expected performance is their ability to use English communicatively. Though the output contains grammatical errors, it is acceptable as long as communication flows. Slightly different in terms of viewing grammar teaching, Teachers A and B used the learner-centered method. They provided their students with a number of examples and demanded that the students induce the grammatical rules from the sentences given. This, in a sense, means that students discover grammar rules while working through exercises. Teacher B reiterated, “grammar needs to be taught to the students but I will teach them implicitly by providing examples and let them analyze the examples and arrive at their own rules”. Teachers C and D, on the other hand, taught grammar explicitly to their students. The students were asked to recognize grammatical rules and then they were assigned to work on their own with teacher’s assistance during the learning process.

As for Question 5, the informants were asked whether they emphasized pronunciation. All informants (N=6) confirmed that they put emphasis on pronunciation when teaching. Teachers E and F explicitly told their students how sounds were produced, while Teachers A and C asked their students to imitate pronunciation from the audio recordings and movies played to the classes. Corrective feedbacks were given for pronunciation in Teachers A and D classes. Teacher A recalled that “the students practiced their pronunciation from sound-track movies and audio recordings. They received corrective feedback when they mispronounced words” This is to say, when students’ outputs were incorrect, all the participants provided correction directly to the learners.

Question 6 asked whether teachers used integrative teaching. Not stating what they meant by “integrative”, all said “yes” to the question. When asked to clarify the terms, they stated that it meant all skills were taught simultaneously. That is, while communication is the focus, grammar was implicitly taught and pronunciation was emphasized. Even in a speaking class, students must listen, speak, read and write. With there was a demand for the teachers to allow all for skills to be heightened, they inevitably have to be able to teach all four skills.

Regarding the medium of instruction (Question 7), all stated that they basically used the target language. Teacher F, however, admitted that he used Thai more often than English. The other participants stated that they mostly used English. No one specifically stated that when and why Thai was used. The teachers who used English more often reasoned that if they spoke English, their students would have an opportunity to improve their listening skill. However, additional to teachers’ utterances, authentic materials such as movies were employed to allow students to be exposed to real life English. The section below deals with questions regarding teaching materials.
Teaching Materials
Questions 8-11 were included in this section: 8) whether the text assigned was a self-compiled or commercial text, 9) whether all the contents in the text were covered, 10) whether additional materials were used, and 11) whether the teachers assigned outside readings. Moreover, as far as the operationalized definitions are concerned, for the purpose of this section, authentic materials refer to language materials that are originally intended for native speakers, not L2 learners and modified materials are those taken from non-language learning sources and modified for language learning purposes.

The data shows that all informants stated that they used a self-compiled text and most of their materials were authentic materials. They reported having compiled many authentic materials because the authentic materials seemed to be interesting to the students. The typical text usually consisted of more pictures and graphic information compared to the text provided from the university. Teachers A and B, for example, stated that they selected the chapters from different authentic texts because unlike the texts provided from the faculty, the texts consisted of pictures and graphic information which seemed interesting to the students. As for technical terms used in authentic materials, Teacher C admitted that using many different texts will facilitate the students in allowing them to recognize different terms of the same word.

It was found that no teachers interviewed used commercial texts. The texts used were self-compiled. Bits and pieces were excerpted from here and there. While one stated that there was not enough time to cover all the materials prepared, some said that they completed what they had set out to do. One who said that he completed the whole text stated that he only covered the main points without going into the details (Teacher F). This means that students are left to pick up the details on their own.

Regarding additional supplements, the element of which was asked in Question 10, all informants (N=6) indicated that they often came up with additional materials in their teaching. In such cases, then the materials were authentic. Some used online journals, extra clips from English language newspapers, articles from non-academic magazines, etc. Teacher D who preferred using online journals mentioned that such journals were beneficial because online articles were up-to-date and students could learn from various forms and styles of academic writing.

In question 11, the informants were asked whether they assigned outside readings to their students. Four teachers stated that additional readings were requirements in their classes. Two only recommended that students do additional readings without assigning any particular text and asked that students look for reading material on their own (Teachers A and C). Teacher F bluntly stated that if the additional readings were not viewed as the class requirements, none of the students would read them on their own. As such, students were forced to read at least one assigned reading.

With the data discussed so far, one point is obvious. That is, there are different styles of teaching which are employed for teaching different skills of English. Materials used vary from teachers to teachers. Nevertheless, whatever the method used, there seems to be no guarantee that the objectives set will be reached. To know whether the time and energy invested yield expected result or not, some type of evaluation must be made to ensure that students’ performances are up to the standard. This, in a way, will allow teachers to re-evaluate their teaching styles and make any necessary adjustments. The next section concentrates on evaluation.

Evaluation
In this section, three questions were asked: 12) whether or not the participants themselves wrote the exam questions, 13) what the format of their exams looked like, and 14) whether or not the questions in the exams emphasized any particular skills.

According to the data, in answering Question 12, all informants (N=6) wrote the exam questions themselves. Teacher A adapted the exam questions from CU-TEP test (Chulalongkorn University Test of English Proficiency). He believed that the test was standardized and using it was much more convenient than writing a new test (of which the validity would have to be ascertained). Teachers D, E, and F, however, see the benefit of writing
their own exams. They stated that their own questions met their objectives since they could base the questions on what had been taught.

As for the format of their exam questions, all informants used more essay questions and fill-in-blanks questions than the multiple choices and true/false questions. They found that using the essay format in their exams could, somehow, improve the writing skills of their students. One participant (Teacher F) mentioned the advantage of essay exams, stating “...essay exams are a useful tool for finding out if my students can sort through a large body of information, figure out what is important, and explain why it is important”. In the same vein, Teacher B argued that using essay exams could force the students to come up with the key ideas pursued in the class on their own and put them in their own words or to use interpretive or analytical skills practiced in the class. However, according to Teacher A, unseen questions were used when he wrote the exam questions, no matter how the word “unseen” is defined. Another participant (Teacher C) often wrote exams by using the essay format and fill-in-blanks. She also employed pre/post- tests in order to mature the student’s development. Allowing students to use a dictionary in the examination is the style Teacher D used. He thought that using a dictionary when doing a test might help his students express their ideas clearly. Unlike the other participants, Teacher E did not focus on grammar when marking essay questions. What she expected was the content the students expressed especially when the objective of the course was fluent communication.

Question 14 was designed to elicit the answers from the informants concerning the objective of evaluation in specific skills. Three teachers (Teachers A, B, and D) evaluated the students’ skills depending on the course objectives. For example, Teacher D said, “I didn’t evaluate my students in all four skills (speaking, listening, writing, and reading) in one particular course. It depends on what the course description requires.” The rest of them (N=3) evaluated their students by emphasizing on all four skills. They argued that emphasizing all skills in the evaluation could be the beneficial method to improve the students’ proficiency. Moreover, Teacher E mentioned that she emphasized four skills when she evaluated her students and this would help the students to communicate effectively.

As far as the evaluation is concerned, it concerns the measuring of students' achievement on the outcomes. However, as facilitators, teachers should take full responsibility to also closely monitor and possibly measure the development of the learners. As of now, no agreements have been reached on what the most effective tool may be when measuring the students’ development. Should students be tested by the evaluation designed specifically for a particular course or by the evaluation has been designed to test the general skills of English? In fact, it is and has always been the teacher’s decision on the format and the timing of evaluation. This is to say, one of the important factors that we should take into consideration when it comes to success in language teaching is teacher’s belief. The next section then shifts the focus the participants’ points of view toward EFL teaching in Thailand.

The points of views toward EFL teaching in Thailand
In this section, the informants were asked four questions concerning their beliefs toward EFL teaching in the Thai context. Question 15 was used to elicit the informants' beliefs about the low English proficiency scores of Thai English learners. Two salient themes emerged from the interview data: 1) external factors of the learners such as the lack of natural environment in which English is used, insufficient input, and ineffective teaching styles; and 2) an internal factor, namely motivation. I begin with the external factors.

Four informants (Teachers A, B, D, and F) shared the same idea that their students could not achieve high proficiency scores because they lacked the opportunity to use English to communicate as their speech community-Thailand- does not require the use of English in everyday life. Teacher B, for example, mentioned that “In my opinion, Thai children are not in the environment that allows them to speak English and they don’t have the opportunity to use English to communicate with others...” Another external factor mentioned by the participants was the ineffective teaching style of English teachers in Thailand. Teacher C viewed that students should be taught by native-speaking teachers rather than by Thai teachers. To him, the beneficial aspects of learning English with native-speaking teachers are pronunciation, the native-like accent, and the listening skill. Teacher F supported that the English proficiency of students reflected the ineffective teaching styles, stating that using a communicative approach in a language classroom was one of the effective styles he used but was
not very popular among most Thai teachers of English. He also argued that lacking sufficient input was the major problem he found with students with low English proficiency, no matter how “sufficient input” was defined.

As for the internal factor, motivation seems to be the key. Teacher C found that highly motivated students performed better than lowly motivated students. She accepted that motivation was the basic factor which facilitated the learning process and led to successful language learning.

As far as the age of second language learners are concerned, the informants were asked, “In your opinion, what is the most appropriate age for a child to acquire an additional language?” All (N=6) agreed that second language should be taught to L2 learners when they were children. Most of them stated that English should be taught at the age of 4 or 5. Teachers B, C, and D believed that L2 should be taught after a child knew the basic structure of L1. Teacher B, for instance, stated, “the appropriate period is when s/he has a certain degree of L1 knowledge and then let her/him learn a new language. I think it should be learnt at grade 4. S/he can compare the similarities and the differences between two languages and understand how they work.” The other participants (Teachers A, E, and F) stated that L2 should be taught to a child at the time when they were acquiring L1. They believed that, in terms of language acquisition, children could easily pick up any language since language was unconsciously learnt.

Another important point related to English language instruction which all informants were asked was whether English language should be effectively taught by Thai teachers or native speaking teachers. Three teachers (Teachers A, B, and F) believed that English should be taught to Thai students by both Thai and native speaking teachers. They asserted that writing and reading classes should be taught by Thai teachers since the lessons were complicated to students with low proficiency. However, speaking and listening skills should be trained by native speaking teachers. Teacher B stated, “Writing is no one’s first language. I think writing English should be taught by Thai teachers so that the students can get over the difficulties when communicating with teachers.” Teacher A supported that “…students should basically learn the language with Thai teachers but let the native speaking teachers play an important role when it comes to practicing the speaking and listening skills.”

Teacher C, on the other hand, viewed that the most effective method when it comes to acquiring a second language was learning it with a native speaking instructor. Unlike Teacher C, Teacher D argued that Thai students should learn English with Thai teachers. He reasoned that “students should learn English with an efficient Thai teacher because a Thai teacher has the basic knowledge about the learners’ background and a Thai teacher can use Thai to explain complicated lessons” Only Teacher E believed that instructors were not an important factor successful second language acquisition. She stated that students, themselves, played the most important role when acquiring a second language. Teachers, be they Thai or native speakers of English, could not help them to if the students themselves were not highly motivated.

The last question, Question 18, asked whether English should be mandatory for Thai students. All informants (N=6) agreed and shared the same idea. Teacher A stated, “English should be mandatory for Thai students with no doubt, of course. English plays a crucial role in everyday life. In all fields, technology, education, and commercial, one cannot live without using English. The communicative English users can easily have access to all sources such as the Internet, text books, and any academic information.”

Teacher D brought up an interesting idea about English as a basic skill for Thai students, stating that “I think English should be included in any course syllabus for any field of studies. In the next ten years, in Thailand, English will no longer be defined as a special skill but the basic skill which is considered the standard to all careers.”

As shown in the data described above, it can be readily seen that different teachers have experienced different challenges. Though they share ideas in certain aspects of teaching, there remain differences in their views. As this study is descriptive in nature, it does not aim at prescribing remedies for the challenges encountered. The remedies, as the researcher believes, is context- (if not individually) specific. The challenges the informants
feel they are facing in this study, when asking the students who are on the other side of teaching, might not be problematic to them at all. As such, this study does not attempt to make a statement such as “if problem A occurs, use method B to solve it.” As we all know too well, human beings as teachers and learners are not machines. Both are sensitive to physical, social, and cultural contexts of teaching and learning. The next chapter provides the conclusion to the study.

CONCLUSION

Insofar as the challenges the teachers have in teaching English, this study describes the challenges the teachers of English as a foreign language come across when they teach. As the study was designed to explore how local Thai EFL teachers dealt with their teaching situations, the questions asked in this research not only focus on the challenges participants actually face in the EFL classrooms, but also how they deal with such challenges.

Teaching and learning any foreign language demands efforts from both the teachers and the learners. Since classroom atmosphere is never exactly the same as the natural setting, simulations are often created. As such, input is artificially created by the teachers with hope that learners can acquire the language taught naturally. Teachers then take on the role of input providers, mistake correctors, and coaches at the same time. The results from the semi-structured interviews, as discussed in Chapter 4, indicated that the challenges range from students having low proficiency all the way to the university’s policy on admission. As a result, there are students of many levels in one class. This creates even more difficulties to the teachers since they have to cater to students of all levels of competence.

Dealing with their challenges, each teacher employs individualized techniques. According to the data, the informants deal with the challenges using his/her knowledge, instinct, and experiences. When dealing with students of many levels in one class, one informant, for instance, fixed the problem at its cause. She contended that rudimentary grammar needed to be explained before she could move on to teaching other things. Time, as a result, was slotted for grammar teaching to assure that all students have somewhat the same knowledge. Students who know these rudimentary rules can think of this lesson as a review while those who lack knowledge are provided with the information essential for further input. Another minor challenge the teachers are faced with, for instance, is students having narrow vocabulary. Oftentimes, students are not able to translate the words asked. This stops them from advancing to higher levels. According to one informant, misspelling is the most obvious indicator of not having adequate vocabulary. Attempting to rectify their problems, some students use inappropriate words. For example, a word usually used in an informal situation is used in a piece of writing which requires formality. This creates the domino effect since the use of inappropriate vocabulary leads to the problem of foreign language pragmatics.

For positive results, teachers must be aware of not only their actions in class but also their roles at any particular time. Lessons need to be prepared in advance. They must be aimed at creating input, correcting mistakes, and the like. Inevitably, they must be able to identify phenomena that occur in classrooms. For example, they are expected to be able to distinguish mistakes and errors, give positive feedback, and, most of all, enhance the students’ performances. Moreover, mistakes are to be labeled, and knowing the causes of which can guide teachers to find the most appropriate remedy.

While this study does not attempt to make any generalization, it aims only to reflect teachers’ views which might be useful for those who would like to become foreign language teachers. They can, for instance, get an idea as to how challenges are met. The study does not provide any fixed solutions to each challenge since it is the researcher’s belief that different challenges have their own merit and that teaching and learning are a joint effort of both the teacher and the learner. Both parties therefore have to reconcile their differences and make necessary adjustments as they see fit. As the data is solely from the teachers, this study is far from giving a complete picture. More needs to be done to obtain data on students’ views.
WJEIS’s Note: This article was presented at 4th World Conference on Educational and Instructional Studies-WCEIS, 05-07 November, 2015, Antalya-Turkey and was selected for publication for Volume 6 Number 1 of WJEIS 2016 by WJEIS Scientific Committee.

REFERENCES


METAPHORS ABOUT MATHEMATICS
OF INDUSTRIAL VOCATIONAL HIGH SCHOOL STUDENTS

Fatma Sevindik
Nasrettin Hoca Technical Anatolian High School
Konya-TURKEY
fatmasevindik_@hotmail.com

Assoc. Prof. Dilek Sezgin Memnun
Uludag University
Faculty of Education
Bursa- TURKEY
dilekmemnun@gmail.com

Dr. Selin Çenberci
Necmettin Erbakan University
Konya- TURKEY
scenberci@konya.edu.tr

Abstract
In recent years, industrial vocational high school students are located on the last steps in high school entrance exam. Hence, vocational high school students’ entrance exam mathematics results are very low. Because of that, this research is aimed to reveal metaphorical thoughts of vocational high school students about “mathematics” through metaphors. A total of 160 students who were studying in an industrial vocational school in 2014-2015 academic year are asked to complete the phrase of “mathematical is like…….. because……” with this aim. Students were given sheets and asked to write their thoughts by focusing on one metaphor. The data of the research was analyzed through content analysis method. The metaphors developed by these students were determined, classified and categorized at this stage. At the end of the study, a total of 36 valid metaphors were identified and they were classified under 9 different categories. Besides, according to the meaning expressed, these metaphors are grouped under the headings of positive, negative and both positive and negative by students. The results of the research indicated that more than half of the students think mathematics as a negative issue.

Keywords: Mathematics; Industrial vocational high school students; Metaphor.

INTRODUCTION
In recent years, after becoming compulsory in our country, the schooling rate in secondary education has increased. Students completing the first eight years of their education prefer different types of high schools according to scores they get from high school entrance examinations and their interests.

Among the purposes of the vocational and technical secondary education programs is preparing students for both life and work areas in the direction of their interests, desires and abilities (The Vocational and Technical Education Regulations, 2002: 25). The vocational and technical high schools train intermediate elements for many sectors varying from education to industry, from trade to technology and divide into types according to sectors for which they train elements. Individuals graduating from such kinds of high schools become capable of working in various occupations according to the area/branch they choose. Moreover, students graduating from these kinds of secondary education institutions get the right to transition to associate degree programs of universities without entering examinations according to the area/branch choices. In addition to having a
profession, their having the right to continue university when they graduate without being obliged to enter the
general examinations seems to have increased the demand for these high schools.

In the 2014-2015 educational year, all the vocational high schools were gathered under the name of
“Vocational and Technical Anatolia High School” with the aim of decreasing the variety of schools in the
vocational and technical secondary education (MNE, the circular numbered 2014/8). However, this decision has
newly started to be put into practice as it is understood from the dates. While there were different schools
with many names such as health vocational high school, trade vocational high school, industrial vocational high
school, etc. in previous years, these programs were combined under a single name in this educational year.
Although there was a name change, it was announced in this circular that the education periods of high schools
which are in service as connected to the General Directorate of Vocational and Technical Education and the
rights and authorities of graduates would not change. Individuals graduating from these kinds of education
programs have some rights to transition to higher education institutions especially related to their professions.
Vocational and technical secondary education institutions do not only provide their students with the right to
vocational schools without examinations, they also give those who prefer departments related to their
professional areas extra points in the Examination for Transition to Higher Education (ETHE) and
Undergraduate Placement Examination (UPE). However, if we look into the recent examination statistics of the
Student Selection and Placement Center (SSPC), we observe that vocational high schools take place near the
bottom in the distribution of the percentages of the students getting a score of 180 and over in the ETHE. It is
observed that especially only 28%-30% of the students of industrial high schools, one of the vocational and
technical high school types, can get a score of over 180, take place in the last steps of achievement ratings
different for UPE. In all the score types and especially in the score type of Mathematics and Science (MS), most
of vocational high schools remained under the Turkey average (SSPC 2014-UPE Results, SSPC 2013-UPE
Results).

There are many factors affecting educational achievements of individuals. We can mention perception,
interest, attitude and anxieties among the psychological factors affecting failure. In this study, mathematical
perceptions of vocational high school students whose mathematical achievements are low in general
examinations will be examined. Within this scope, the method of metaphorization will be used. Metaphor can
be defined as “a strong mental mapping and modeling mechanism aiming to understand and structure
individuals’ own worlds” (Arslan & Bayrakç, 2006: 103). In order to make a concept which is abstract for an
individual a concrete one to have them better understand it and to reach from a known state to an unknown
one, metaphors are used.

In education, many studies have been carried out to investigate into emotions, thoughts and opinions of
participants via metaphorization. In studies carried out especially on mathematics, different perceptions such
as mathematical perception and mathematics teachers' perceptions were analyzed (Erdogan, Yazlik & Erdik,
2014; Guler, Akgun, Ocal and Doruk, 2012; Guner, 2013; Hangul, Gur & Kara, 2014; Oflaz, 2001; Saban, 2006;
Sengul, Katranci & Cantimer, 2014). Most of these studies (Erdogan, Yazlik & Erdik, 2014; Guler, Akgun, Ocal
and Doruk, 2012; Guner, 2013; Hangul, Gur & Kara, 2014; Oflaz, 2001) examined thoughts of students from
different class levels about the concept of mathematics through the metaphor analysis. Of these studies, as a
result of the one carried out by Erdogan, Yazlik and Erdik (2014), it was observed that about 77% of the
mathematics education student teachers developed positive metaphors about the concept of mathematics. As
a result of the study carried out by Guler et al. (2012), it was understood that 28 metaphors were developed by
the secondary education mathematics student teachers in relation to the concept of mathematics and most of
these metaphors were positive. Moreover, as a result of the study made by Guner (2013), 28 metaphors
putting forward the opinions and thoughts of the participant elementary education mathematics, social studies
and classroom teaching student teachers about mathematics were reached and these metaphors were
gathered under the themes of ‘mathematics is a joyful occupation’, ‘mathematics is the life itself’, ‘mathematics
makes life difficult’ and ‘mathematics facilitates life’. Moreover, it was also reported within the scope of this
study that a great majority of the elementary education mathematics student teachers described mathematics
as the life itself. As a result of the study carried out by Hangul, Gur and Kara (2014) with the aim of revealing
the secondary and high school students' thoughts about the concept of "mathematics" through the metaphors,
the metaphors created by the students about the concept of "mathematics" were gathered under 5 different conceptual categories in terms of common characteristics. These conceptual categories were scope of mathematics, difficulty/easiness/nature of mathematics, necessity of mathematics, students' interests/attitudes and teachers' interests and attitudes. Moreover, as a result of the study made by Oflaz (2001), too, the metaphors created by the elementary school students about mathematics were gathered under 6 categories. Most of these metaphors which the students created about the concept of mathematics were gathered under the category of content of mathematics. That the students regarded mathematics as infinite, full of incomprehensible problems and a difficult subject was put forward within the scope of the study. As it is seen, only one of these studies (Hangul, Gur & Kara, 2014) was carried out with high school students. However, not a study carried out with vocational high school students was found.

Different from those studies, in this study, it was aimed to examine the perceptions of vocational high school students with low mathematical success in general examinations about mathematics and reveal metaphors which they have about this matter. Hence, it was tried to understand the feelings and thoughts of the participant industrial vocational high school students about mathematics. Within this scope, it will be investigated into how vocational high school students metaphorize mathematics, under which categories can these metaphors be gathered and again if these metaphors shed light into reasons of low mathematical success levels of these students. Moreover, this study is important and different from other studies in that it examines metaphors which industrial high school students with low mathematical success levels have. Hence, this study will try to reveal the viewpoint of students at vocational high schools where students with low base points are placed about mathematics at the stage of transition from elementary and secondary school to high school. With these aspects, this study is considered to make a contribution to the field.

METHODOLOGY

Research Model
The answers which the industrial vocational high school students participating in this study gave to an open ended question addressed to themselves were analyzed by categorizing via using the qualitative data analysis methods. For this reason, this is a descriptive study based on qualitative data.

In this study, of the qualitative research designs, the “phenomenology” design was used. The phenomenology design covers studying on phenomena of which we are aware but about which we do not have a detailed understanding. It provides an opportunity to obtain individuals' opinions about a matter or an event and hence to get to know a phenomenon (Yıldırım & Şimşek, 2006: 75-77).

Study Group
The study group was composed of the 10th, 11th and 12th grade students taking education in the 2014-2015 educational year at an industrial vocational high school selected randomly from among the industrial vocational high schools in the province of Akşehir. 160 students from different class levels were included in the study. The students participated in the study voluntarily.

Data Collection Tools and Procedure
With the aim of revealing the participant students’ mathematical perceptions, the students were given forms on which it reads “For me, mathematics is like …… because …….” and they were asked to fill in these forms. In the meantime, the students were asked to create a simile while filling in this form. Then, the students were also asked to explain why they created that simile. The students willing to participate in the study based on voluntariness completed the forms within a time period of average 15-20 minutes.

Analysis of the Data
In the analysis of the data obtained within the scope of the study, the content analysis method was used. In this content, the obtained data was transformed into systematic data and categories were formed.

The metaphors developed by the students were analyzed and interpreted in three stages: (1) Determination of the metaphors, (2) Classification of the metaphors and (3) Categorization of the metaphors. In this scope, firstly
the forms filled by the students were read by the researcher before making any classifications. At the end of the first reading, 12 forms including no similes or no explanations in the ‘because’ part were excluded from the study. Then, at the stage of determination of the metaphors, the metaphors developed by the students were coded, listed in alphabetical order and 36 valid metaphors were ranked in accordance with their percentages. At the stage of classification of the metaphors, similar metaphors were found and categorized according to the characteristics which they shared with the other metaphors. Then, at the stage of categorization, the metaphors were analyzed in terms of their shared characteristics related with the concept of mathematics. At this stage, it was looked into how each metaphor conceptualized mathematics. Later, according to their common characteristics, the metaphors were gathered under 9 different categories: viewpoint, related to life, horrible, entertainment, esthetic, identified with human, requirement, incomprehensible subject and other.

In the classification, quantification and categorization of the obtained data, the Microsoft Excel and SPSS 16.0 programs were used. In this scope, at the stage of quantification and categorization of the research data, percentage and frequency values were calculated.

FINDINGS

This section includes the research findings obtained as a result of the statistical analyses made with the aim of examining the metaphors which the participant students developed for mathematics and the interpretation made for these findings.

It was observed in the examinations made that 160 participant industrial vocational high school students created a total of 36 metaphors in relation to the concept of mathematics. The percentage and frequency values of the distributions of the metaphors which the participant students developed into these categories were given in Table 1.

When Table 1 was examined, it was observed that an important part of the participant industrial vocational high school students (25.67%) described mathematics as a difficult subject, a part of them (10.13%) as a boring...
subject and a part of them (8.1%) as life. This indicates that an important part of the students had a negative perception about the concept of mathematics.

Then, these metaphors which the high school students developed were divided into 9 categories. These categories related to the developed metaphors were viewpoint, related to life, horrible, entertainment, incomprehensible subject, requirement, esthetic, identified with human and other.

Table 2: Distribution of the Metaphors Created for the Concept of Mathematics into Different Categories

<table>
<thead>
<tr>
<th>Categories</th>
<th>Metaphors</th>
<th>Number of Metaphors</th>
<th>F%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewpoint</td>
<td>A difficult subject, a boring subject, a good thing, a necessary subjects, an unnecessary subject, a simple thing, a disgusting situation, nonsense, reasonable, unreasonable</td>
<td>10</td>
<td>87</td>
<td>58.78</td>
</tr>
<tr>
<td>Related to life</td>
<td>Life, life examination, losing joy of life, a waste of time</td>
<td>4</td>
<td>15</td>
<td>10.16</td>
</tr>
<tr>
<td>Horrible</td>
<td>A dark cemetery, zombie, torture, load, illness</td>
<td>4</td>
<td>14</td>
<td>9.47</td>
</tr>
<tr>
<td>Entertainment</td>
<td>Game, puzzle, alcoholic drink</td>
<td>3</td>
<td>10</td>
<td>6.75</td>
</tr>
<tr>
<td>Esthetic</td>
<td>Beauty, a nice-smelling flower</td>
<td>2</td>
<td>5</td>
<td>3.37</td>
</tr>
<tr>
<td>Identified with human</td>
<td>Unloved person, mathematics teacher</td>
<td>2</td>
<td>5</td>
<td>3.37</td>
</tr>
<tr>
<td>Other</td>
<td>Clock, lorry, back-of-the-envelope calculation, a child's toy</td>
<td>4</td>
<td>5</td>
<td>3.37</td>
</tr>
<tr>
<td>Requirement</td>
<td>Health, love, money, sun</td>
<td>4</td>
<td>4</td>
<td>2.70</td>
</tr>
<tr>
<td>Incomprehensible subject</td>
<td>Foreign language, world of numbers</td>
<td>2</td>
<td>3</td>
<td>2.03</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>36</td>
<td>148</td>
<td>100.00</td>
</tr>
</tbody>
</table>

When the pieces of information given in the above table was examined, it was understood that more than half of the metaphors (58.78%) which the participant students created for the concept of mathematics were the ones included in the category of viewpoint. In the category of viewpoint, the students stated their ideas about the subject of mathematics. As it is understood from the metaphors, in this category, the metaphors describing mathematics as difficult, boring, unnecessary are more in number. The statements of “For me, mathematics is a difficult subject because I do not have a numerical aptitude.” and “For me, mathematics is a boring subject because I do not understand, and time wears away.” are the examples from the students’ answers. The common point of the metaphors (10.16%) belonging to the category of life taking place in the second rank is their including opinions about that mathematics is like the life itself, and not only indispensible but also difficult. Although mathematics includes comments like indispensible, necessary, as it is understood from the metaphors of losing joy of life and a waste of time, they rather represent a negative image. Here are some student answers about this matter: “For me, mathematics is like life. For we all need mathematics in every part of our life.”, “For me, mathematics is like a life exam. For if I get a low mark from mathematics, it plays on my life.” If we look at what these students wrote, it is observed that although they fail the course, they are aware of the place of the course in school life and real life. The metaphors included in the category of horrible (9.47) emphasize that mathematics is a frightening and tension-creating course in the eye of students. The students described mathematics as torture and put its frightening aspect into words with the metaphors of cemetery and zombie. A student writing down the metaphor of torture wrote these: “For me, mathematics is like torture. For too many operations are done, it includes complicated operations.” With three metaphors included in the category of entertainment (6.75%), the students emphasized the enjoyable aspect of mathematics. They likened doing mathematics to playing a game or described it as solving a puzzle. One of the students' statements classified in this category is this “For me, mathematics is like a puzzle. For me, solving questions, equations is like solving a puzzle.”

In the category of esthetics (3.37%), it can be stated that there is an emphasis on the esthetic aspect of mathematics. For the students made the comparisons of beauty and a nice-smelling flower and stated in the
explanation part that they enjoyed occupying with mathematics. The reason why the classification of identified with human was made (3.37%) was the formation of the metaphors included in this category through likening the metaphors to some humans. Under the heading of this category, the students either gave the names of those whom they did not like or the statements of the students using the names of their mathematics teachers as metaphors were taken into the scope. A student wrote these: “For me, mathematics is like F... Y.... For like him/her, it is a good course. All the courses s/he teaches are enjoyable.” Moreover, the common characteristic of the metaphors included in the category of requirement (2.70%) was the emphasis made on the necessity of mathematics. The students explained that they required mathematics after the “because” part, too. It can be thought like health, like sun; its absence cannot be imagined. However, the least number of metaphors which these students created about mathematics were the ones related to the category of incomprehensible subject. Of the metaphors included in the category of incomprehensible subject (2.03%), the metaphor of foreign language makes an emphasis on the incomprehensibility of mathematics. The students creating this metaphor wrote these: “For me, mathematics is like a foreign language. For I do not understand it at all.” Under this category, another student described mathematics as a separate universe, the world of numbers, too. However, the metaphors included in the category of other were lorry, clock, back-of-the-envelope calculation and child’s toy. With the metaphor of lorry, it was stated that those who knew how to do mathematics would love the course, but those who did not would fall down. With the metaphor of clock, it was emphasized that mathematics is a cumulative course continuing interrelatedly. Moreover, by comparing it to the back-of-the-envelope calculation, it was aimed to state that mathematics is easy and necessary for daily chores. And the metaphor of child’s toy was created with a sentence continuing with the statement that mathematics is very easy.

As it is seen from the above explanations, the answers from the participant industrial high school students are various and contradictory. Because of individual differences, it is inevitable that they have different attitudes toward the course depending on their interests. Since the purpose of this study was to reveal the mathematical perceptions of the industrial vocational high school students, in this section, the metaphors were re-explained under the categories of positive, negative and both positive and negative according to the explanations in the “because” part. In the table given below, the positive metaphors which the students developed for the concept of mathematics are listed.

Table 3: Positive Metaphors Created for the Concept of Mathematics

<table>
<thead>
<tr>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A good thing</td>
<td>11</td>
<td>7.42</td>
<td>8</td>
<td>Reasonable</td>
<td>2</td>
<td>1.35</td>
</tr>
<tr>
<td>2</td>
<td>Game</td>
<td>6</td>
<td>4.05</td>
<td>9</td>
<td>Money</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>3</td>
<td>A necessary course</td>
<td>5</td>
<td>3.37</td>
<td>10</td>
<td>Health</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>4</td>
<td>Beauty</td>
<td>4</td>
<td>2.70</td>
<td>11</td>
<td>Back-of-the-envelope calculation</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>5</td>
<td>A simple thing</td>
<td>3</td>
<td>2.08</td>
<td>12</td>
<td>Sun</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>6</td>
<td>Puzzle</td>
<td>2</td>
<td>1.35</td>
<td>13</td>
<td>A nice-smelling flower</td>
<td>1</td>
<td>0.67</td>
</tr>
<tr>
<td>7</td>
<td>A child’s toy</td>
<td>2</td>
<td>1.35</td>
<td></td>
<td>Total</td>
<td>40</td>
<td>27.02</td>
</tr>
</tbody>
</table>

As a result of the analyses, it was observed that the industrial vocational high school students created a total of 13 metaphors stating positive perceptions about the concept of mathematics. In this scope, it was understood that the metaphors which 27.02% of the participant students created for the concept of mathematics were positive. In these categories, the students stated that they found mathematics necessary and entertaining, simple, good and nice and loved the course of mathematics. Moreover, in the metaphors of reasonable and necessary, it was observed that the students were aware that the course is associated with every area in life. Generally, it can be stated that the individuals creating these metaphors loved the course of mathematics. The students had both positive and negative metaphors about the concept of mathematics. Moreover, in Table 4 given below, these negative metaphors which the students created in relation to the concept of mathematics are listed.
Table 4: Negative Metaphors Created in relation to the Concept of Mathematics

<table>
<thead>
<tr>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A difficult course</td>
<td>38</td>
<td>25.67%</td>
<td>9</td>
<td>Illness</td>
<td>2</td>
<td>1.35%</td>
</tr>
<tr>
<td>2</td>
<td>A boring course</td>
<td>15</td>
<td>10.13%</td>
<td>10</td>
<td>A dark cemetery</td>
<td>2</td>
<td>1.35%</td>
</tr>
<tr>
<td>3</td>
<td>Torture</td>
<td>7</td>
<td>4.72%</td>
<td>11</td>
<td>Foreign language</td>
<td>2</td>
<td>1.35%</td>
</tr>
<tr>
<td>4</td>
<td>Non-sense</td>
<td>5</td>
<td>3.37%</td>
<td>12</td>
<td>Load</td>
<td>2</td>
<td>1.35%</td>
</tr>
<tr>
<td>5</td>
<td>An unnecessary course</td>
<td>4</td>
<td>2.70%</td>
<td>13</td>
<td>A horrible situation</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>6</td>
<td>Unreasonable</td>
<td>3</td>
<td>2.08%</td>
<td>14</td>
<td>Losing joy of life</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>7</td>
<td>An unloved person</td>
<td>3</td>
<td>2.08%</td>
<td>15</td>
<td>A waste of time</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>8</td>
<td>Alcoholic drink</td>
<td>2</td>
<td>1.35%</td>
<td>16</td>
<td>Zombie</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>89</td>
<td>60.14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As a result of the analyses, it was observed that the high school students created a total of 16 metaphors stating their negative perceptions about the concept of mathematics. In this scope, it was understood that the metaphors which 60.14% of the participant industrial vocational high school students created for the concept of mathematics were negative. In this category and in general sense, with its frequency and percentage values, the metaphor used by the students most frequently was the metaphor of a difficult course. 25.67% of the students described mathematics as a difficult-to-understand and succeed course. When the explanation parts of the metaphors included in this category were examined, it was understood that the participant high school students had low interest in the course, did not love the course, were afraid of the course and, for this reason, created these metaphors. Moreover, in these metaphors, there are complaints about the number of lesson hours of mathematics and doing complicated mathematical operations. However, a great majority of the students creating the metaphors of boring, difficult and unnecessary (10.13%, 25.67% and 2.7%, respectively) stated that they would not need mathematics in their future jobs. In other words, these students found the teaching of this course unnecessary because of thinking that they would not use it anywhere.

The classifications of both positive and negative metaphors were made again by considering the statements which the students wrote after the "because" part in the text addressed to them. And the findings belonging to this category were listed in Table 5.

Table 5: Students’ Metaphors Stating both Positive and Negative Perceptions

<table>
<thead>
<tr>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
<th>No</th>
<th>Metaphors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Life</td>
<td>12</td>
<td>8.10%</td>
<td>5</td>
<td>Lorry</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>2</td>
<td>Teacher / Individual</td>
<td>2</td>
<td>1.35%</td>
<td>6</td>
<td>Clock</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>3</td>
<td>Love</td>
<td>1</td>
<td>0.67%</td>
<td>7</td>
<td>World of numbers</td>
<td>1</td>
<td>0.67%</td>
</tr>
<tr>
<td>4</td>
<td>Life exam</td>
<td>1</td>
<td>0.67%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18</td>
<td>12.16%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The common point of the metaphors was their answering both negative and positive statements about mathematics at the same time. As a result of the analyses, it was observed that 12.16% of the participant industrial vocational high school students created a total of 7 metaphors stating both positive and negative perceptions about the concept of mathematics. In this scope, a great majority of the students (8.1%) wrote the metaphor of life. While a part of the students emphasized the necessity of mathematics with this metaphor, another part of them mentioned that mathematics was difficult and not loved.

CONCLUSION AND SUGGESTIONS

The vocational high school students are those who exhibit low performance in the general examinations held in Turkey and there are many reasons underlying this failure. And students’ mathematical perceptions affect their mathematical achievements levels, too. For this reason, in this study, the metaphors which the industrial
vocational high school students created for the concept of mathematics were examined and, over these metaphors, these students’ positive and negative thoughts about mathematics were revealed.

The participant high school students created a total of 36 metaphors within the scope of this study. Then, these metaphors were gathered under 9 different categories. These categories were viewpoint, related to life, horrible, entertainment, esthetic, identified with human, requirement, incomprehensible subject and other. Finally, the metaphors were also gathered under three main headings according to what the students wrote down in the "because" part of the forms addressed to them. These were positive, negative and both positive and negative metaphors. In this scope, while 27.02% of the participant students created positive and 12.16% created both positive and negative metaphors, 60.14% created negative metaphors. From here, it is understood that more than half of the students created negative metaphors about the concept of mathematics. This indicates that the mathematical images of the industrial vocational high school students were generally negative. These thoughts of theirs about the course may affect their success in the course of mathematics. And their thinking that they show no interest in or cannot do the course account for the unwillingness of these students having a negative thought about mathematics about taking the course and participating in lessons. In the continuation of the negative metaphors, such statements as “... because it is very boring course.”, “... because we write too many things and do too many mathematical operations.”, “... because I will become an electrician, where will I need mathematics?” , “... Because everybody has an area of specialization, who needs mathematics ...” were frequently encountered. This reached result does not overlap the results obtained in the study carried out by Erdoğan, Yazlık and Erdik (2014) with elementary school mathematics teachers and the one made by Güler et al., (2012) with secondary education mathematics student teachers that most of the students developed positive metaphors about the concept of mathematics. Moreover, the categories reached within this scope differ from some of the categories reached as a result of the study carried out by Hangül, Gür and Kara (2014) with secondary school and high school students.

It is clear that students also exhibit low success in the exams which they enter in the transition to high school for this type of high school. This being the case, they have difficulty in almost all the courses and mathematics comes in the lead of the courses in which they have difficulty. Many students stated that they wrote too many things and did too many mathematical operations in lessons. Another situation was that the course was described as boring. This may be changed, though partly, by giving place to different educational activities in math lessons. Lessons can be made more interesting by using presentations, videos, physical or imaginary manipulations and different materials about the subject. Moreover, the students’ thinking that they will not use mathematics in their future occupations causes them to regard this course as unnecessary. However, there is mathematics on the basis of many professional programs (electric – electronic, information systems, motor, etc.) taught in industrial vocational high schools. However, among the purposes of the course of mathematics are having students “develop problem solving skills”, “acquire mathematical thinking skills”, “appreciate mathematics and mathematics education” (MNE, 2013). In other words, with these objectives, it was aimed to have students not only do operations with the subjects of mathematics but also acquire the ability to overcome daily life problems. It is also important that students should be made aware of these and, in math lessons in smaller classes, they should be made to anticipate that mathematics is associated with daily life and aware that mathematics is useful and valuable. And reaching such a result despite the practicing of course programs having undergone fundamental changes in recent years at schools in Turkey makes us consider that sufficient importance is not attached to the usefulness, importance and life relatedness of mathematics in elementary school classes or these types of information are insufficient in course programs and textbooks. About this subject, especially mathematics teachers have important responsibilities. Classroom and mathematics teachers can be made to put more emphasis on these matters in math lessons.
REFERENCES


Ortaöğretim İzleme ve Değerlendirme Raporu, 2013


CONCEPTUAL UNDERSTANDINGS OF SEVENTH GRADE GIFTED STUDENTS REGARDING SEVERAL SITUATIONS INVOLVING CHEMICAL CHANGES

Res. Assist. Handan Ürek
Balıkesir University, Necatibey Education Faculty
Elementary Science Education Dept.
TURKEY
handanurek@balikesir.edu.tr

Assist. Prof. Dr. Gamze Dolu
Balıkesir University
Necatibey Education Faculty
Elementary Science Education Dept.
TURKEY
agamze@balikesir.edu.tr

Abstract
Concept teaching in gifted children comes out as an issue which needs to be focused on. The main institutions which support those children in addition to their school life in Turkey are Science and Art Centers (SACs). Thus, the studies conducted in SACs with gifted children are significant. In this study, it is aimed to investigate the conceptual understandings of middle school 7th grade gifted students regarding several situations involving chemical changes from daily life. The study was conducted with 37 students who attended 2 different SACs in the western part of Turkey in spring term, in 2014-2015 academic year. In data gathering, a test which consisted of 3 open ended questions developed by the researchers was utilized. Collected data was analyzed via content analysis and quantified by calculating frequencies. The findings of the study are expected to contribute to the educators by providing ideas related to the design of teaching activities of those students.

Keywords: Chemical change, daily life, SACs.

INTRODUCTION

Despite being ignored in Turkey for long years and not gaining any significant results, it is a promising situation that gifted education receives importance again and the society becomes aware of it. Correct perception of those children is very important in both their families and in the schools where they receive education. The opinions and believes which involve misconceptions and bias such as “They need less teacher attention since they learn rapidly and without any directions”, “They are high level students who demonstrate good performances during the exams”, “They need no assistance for their studies or homework because they can cope with them all by themselves” (“Giftedness - Myths & Misconceptions”, n.d.) harm those children. On the contrary to those ideas, gifted children require special education and approaches which are different from those of their peers (Baykoç, 2011: 366-369; Sak, 2014a: 133) because those individuals are not ordinary (Sak, 2014: 3). As indicated by Sak (2014b), those students’ education cannot be conducted via riddles, puzzles or mind games.

Gifted Students and Science Education

When the studies in that field are examined, concept teaching in gifted students becomes clear as an issue which needs to be concentrated on. However, it has been seen that especially most of the theses researches focus on psychological factors and there is a vacancy in the field of teaching (Ürek and Arıkıl, 2013). When the conducted studies are examined in terms of science teaching in gifted students, it has been determined that
there are few studies related to limited subjects in science teaching (Çakır, 2011; Çalıkçı, 2014; Doğan, 2007; Kanlı, 2008; Vural, 2010). It has also been asserted by Vural (2010) that there is a vacancy in the literature related to the studies aiming concept teaching in gifted students.

Science and Art Centre Model
In Turkey, the major institutions which support gifted students’ education in addition to their school education are Science and Art Centers (SACs) which was firstly founded as Yasemin Karakaya SAC in Ankara in 1995 and today they have been located in more than 60 provinces of Turkey with a number over 70. Those children seize the opportunity of studying and producing regarding their own interests and abilities with their peers who are similar to themselves in SACs while they experience the process of integration with the society in their schools (Baykoç, 2011: 374-375). Thus, the studies related to gifted children conducted in SACs are of great importance.

The selection procedure of the students to the SACs firstly begins with diagnostics of giftedness. Then, in the following years, selected students are educated via applications such as adaptation, support, realizing individual abilities, developing special abilities and project groups which are conducted with small number of gifted students based on investigation and projects. The students who have been identified as “gifted” take this education from the expert teachers in SACs in the periods of time during which students do not go to their school. Those students’ programs in SACs are prepared especially properly for each of them. The activities which enrich the abilities of the students are achieved in or out of the school semesters with the help of projects supported by the Scientific and Technological Research Council of Turkey, nature camps or cooperative researches with universities via the teachers in SACs.

The Significance of Conceptual Understandings in Science Education
In order to design appropriate activities for students, it is required to investigate what those students know – their pre-knowledge related to the concepts which are wanted to given to them. Knowing what students know correctly and what they know partially or incorrectly provide clues for teachers. In this field, there is a huge amount of studies conducted with average intellectual level students in various subjects about conceptual understandings. However, there are not sufficient studies conducted with gifted students studying in SACs which aim to conduct enrichment activities for them. The activities which are conducted in those institutions are directly student centered. Becoming aware of the misconceptions and insufficient knowledge that might be in students and not causing new misconceptions during the activities are crucial for the teachers because when the students assimilate new knowledge on their present knowledge, this situation might bring about various unintended consequences in teaching (Talanquar, 2006). That point requires the examination of conceptual understanding levels of the students according to the subject matter.

As a result of the studies, unfortunately, it has been determined that generally the teachers do not analyze and examine the opinions of the students related to the natural phenomenon (Talanquar, 2006). In addition, again mostly teachers are not aware of the determined misconceptions or they ignore them during teaching (Gabel, 1999). When the examination of the conceptual understandings of the students about various scientific cases are considered in terms of the education provided by SACs, it will be for the favor of gifted students’ science education and contribute to the conceptual understandings of those children.

Concept Teaching Studies Conducted in Science and Art Centers in Turkey
In the literature, there are a few studies which were conducted with gifted students from SACs on the subject of concept teaching in science education (Doğan, 2007; Vural, 2010). Doğan (2007) conducted a study based on case study methodology with the students who were on average intellectual level and who were determined to be gifted in the 5th, 6th and 7th grade levels. In this study, it was aimed to specify the understanding levels and misconceptions of the students related to the concepts of “evaporation”, “condensation” and “boiling”. As a result of the study, it was seen that the level of attainment of the objectives in the teaching program related to the concepts of “evaporation”, “condensation” and “boiling” by the students was the highest for the macroscopic properties of matter whereas this level was lower for the microscopic properties of matter and it was the lowest for the use of those concepts in the explanation of daily life events. Yet, one of the fundamental purposes of science education is to connect theoretical knowledge to the daily life issues. In addition,
differences were identified in the understandings of elementary 5th, 6th and 7th grade gifted and non-gifted students (Doğan, 2007). This consequence indicates the essence of development of activities and teaching programs especially for gifted students.

Vural (2010) made a study based on action research with 6th grade level gifted students. The researcher firstly investigated the conceptual understanding levels and misconceptions of the students about the concepts of “melting”, “freezing” “evaporation”, “boiling” and “condensation”. Then, teaching activities which were prepared considering constructivist approach were implemented to the students to check whether the activities worked or not. In that study, it was found that the students possessed several misconceptions and insufficient knowledge as indicated in the literature previously. The activities implemented to the students helped to improve their understanding levels although they showed a limited change in some situations. Also, it was determined that students could make high level interpretations for the new knowledge that they encountered in pursuit of their giftedness and they did not experience much difficulty at this aspect.

Çakır (2011) who conducted a research based on case study methodology investigated the mental models of gifted students related to the concepts of “conductors” and “insulators”. The consequences of this study demonstrated that the mental models of gifted students were clear and generally compatible with conceptual models. Therefore, it was concluded that the validity of their mental models were high and open to change. Also, it was asserted that those students could make correct predictions with the help of those mental models and construct better mental models when they supported their predictions with the observations. In another study, it was determined that different grade level students possessed better approaches and attitudes towards science when compared to their average intellectual level peers (Ürek, 2012; Ürek and Dolu, 2013). Those results one again approve the necessity and benefit of the activities which are especially developed considering gifted students. The reason why gifted students should be educated with an approach that is different from those of non-gifted students comes out.

Chemistry in Daily Life

The subjects related to chemistry in primary and middle school level are provided to the students in terms of science and technology course in Turkey. One of the aims of science education given to the students is about the utilization and application of the concepts (Çepni, 2011: 9). At this aspect, one of the aims is defined as “Seeing the utilization of scientific concepts in daily life” (Çepni, 2011: 9). However, in a study which was conducted with non-gifted 8th grade level students, it was found that more than half of the students who attended the study failed to relate scientific concepts with daily life (Yiğit, Devecioğlu and Ayvacı, 2004). Additionally, in the same study, it was also found that only one third of the participants could relate chemistry concepts correctly to the daily life. Similarly, studies which were conducted with teacher candidates on relating their chemistry knowledge with daily life reported that they experienced difficulties at that point although being in university level (Özmen, 2003; Yadigaroğlu and Demircioğlu, 2012). Unfortunately, those results indicate us that the concepts are kept in students’ minds based on memorization and the students could not notice their place in daily life issues.

When the aforementioned research subjects are considered in terms of gifted students’ education, it is seen that there is a gap in this field which needs to be focused on. It can be concluded that chemistry knowledge constitutes an important dimension at that point because a previously conducted study reported that chemistry was the mostly reflected science branch on the drawings of the students when both gifted and non-gifted different grade level students were asked to draw a picture of science (Ürek and Arıkıl, 2011). The researchers highlight the significance of teaching relevant chemistry and they attribute various problems in chemistry education to not teaching chemistry relevantly (Holbrook, 2005; Eilks and Hofstein, 2015: 1).

The Aim and Significance of the Study

The aim of this study is to investigate how 7th grade level students who are determined to be gifted and educated via SACs understand various situations encountered in daily life involving chemical changes conceptually.
In the literature, no such studies conducted previously have been encountered by the researchers. At this respect, the study is thought to be original. Also, the findings of the study are expected to supply clues for educators in terms of designing teaching activities for gifted students. When the gaps related to the researches in gifted students’ education are taken into consideration, it is clear that all the studies conducted will make contributions to this field as indicated previously by Ercan (2013). So, this study is important.

**Research Questions**

In the context of this study, the following questions are intended to answer related to the middle school 7th grade level gifted students who attend SACs:

1. How is the conceptual understanding of the students related to the situation involving the concepts of “chemical change” and “sun light”?
2. How is the conceptual understanding of the students related to the situation involving the concepts of “chemical change” and “precaution”?
3. How is the conceptual understanding of the students related to the situation involving the concepts of “chemical change” and “structure of matter”?

**METHODOLOGY**

**Study Design**

The present study is based on case study survey model. In case study survey model, which is one of the survey designs, it is aimed to reach a judgment upon a unit of the universe by examining this definite unit (such as an individual, a family, a school) and by determining its relationships with itself and its environment in depth and width (Karasar, 2008: 86). Also, it has been indicated that most of the case study survey models are qualitative researches and they have been reported to provide more detailed and accurate information when compared to the general surveys (Karasar, 2008: 86-87).

**Study Group**

The study was conducted with 37 students who were attending 2 different SACs in the west part of Turkey. The students were in the middle school 7th grade level. In the process of the determination of the study sample, purposive sampling method which is one of the non-probable and non-random sampling methods was used (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2010: 89). In this approach, information rich cases according to the purpose of the study are selected and investigated in depth (Büyüköztürk et al., 2010: 89). The present study focused on the students who were determined to be gifted and who attended SACs regarding the aim of the research.

**Data Gathering Instrument**

As data gathering instrument, a conceptual understanding test which involved 3 open ended questions developed by the researchers was utilized in the study. In order to supply the content validity of the instrument, views were asked from 2 chemistry education and 3 science education experts. As a result of those views, several improvements were made on the questions. The questions have been constructed upon cases which are encountered in our daily lives and involve chemical changes. It is aimed to find out how students explain those cases theoretically with the questions. The questions in data gathering instrument are phenomenologically framed questions which allow students apply their knowledge to a new situation as described by Driver and Erickson (1983) previously. Such questions were also utilized in a study conducted with high school and university level students on the subject of chemical kinetics (Çakmakçı, Leach and Donnelly, 2007) since the only reason of chemical education is not teaching abstract concepts but also the implementation of this knowledge into new situation and contexts.

In this study, the students’ conceptual understandings are tried to find out by their explanations regarding the cases given in the questions in order to make the concepts concrete since the study group consists of relatively younger students. The questions in data gathering instrument and the concepts investigated via those questions are explained in Table 1:
Table 1: The Questions in Data Gathering Instrument and Related Concepts

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Related Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The doctor gives Ayşe 2 different creams for the treatment of her acnes on her face. He tells Ayşe to apply one of the creams on day time while the other one during only night time by adding that otherwise it might cause spots on her face. How can you explain this situation?</td>
<td>In the first question, the concepts of “sun light” and “chemical change” are underlined.</td>
</tr>
<tr>
<td>2</td>
<td>The pharmacist explains Ali how to prepare the cough syrup by mixing it given by the doctor and asks Ali to keep the syrup in its black bottle with its cap closed. What might be the reason of the pharmacist for this request from Ali?</td>
<td>In the second question, the concepts of “precautions” which should be taken to avoid “chemical changes” that influence us negatively are highlighted.</td>
</tr>
<tr>
<td>3</td>
<td>Mine observes that the golden earrings, which she has been wearing for a year, keep its shining whereas the silver earrings have tarnished. How do you explain this case?</td>
<td>In the third question, the concepts of “the structure of matter” and “chemical change” are focused on.</td>
</tr>
</tbody>
</table>

In the responses of the students to the questions, it was analyzed in what level they reflected scientific arguments on their statements provided for the cases given to them. So, for each of those questions, respectively, it was investigated that:

- The cream which should be applied on face during night time might react with sunlight if it is applied during day time and go on chemical change.
- The cough syrup should be kept in its black bottle and cap closed in order to avoid its contact with sunlight and air, thus to take precaution for avoiding it going on chemical change and spoiling.
- The earrings are made up of different elements whose structures are different. Hence, their color change by time in another words tendency to go on chemical changes might be different.

In the present study, the subject of chemical changes has been addressed. This subject takes place in middle school 6th grade level science teaching program. The subject of matter takes place in both 6th and 7th grade level science teaching program according to the spiral structure of the program. The questions in data gathering instrument intends to determine the conceptual understandings of the 7th grade level students about different cases given to them with their present knowledge.

Data Analysis

The written responses to the questions given by the students were examined one by one by each of the researchers of the study. As a result of this examination, students’ responses were taken into content analysis. Content analysis is an analysis procedure which intends to reach concepts and relationships that could explain collected data, define data and find out the facts in which collected data might be hiding (Yıldırım and Şimşek, 2008: 227).

In this study, previously traced analysis methods in the literature were utilized in the analysis of collected data. Kocakülah (1999) used the categories “scientifically acceptable arguments” and “scientifically unacceptable arguments” primarily in the analysis of the open ended questions which were obtained from his study related to the investigation of the development of university freshman students’ understandings regarding the subject of electromagnetism. Then, he examined the category “scientifically acceptable arguments” under the categories “full argument” and “part of argument”. Kocakülah (1999) indicated that the number of sub-categories related to “scientifically acceptable arguments” might change from question to question regarding the content of the question. The category – “scientifically unacceptable arguments” were analyzed under 2 sub-categories which were “related to the magnetic field and force” and “not related to the magnetic field and force”. In the present study, however, as a result of the examinations, it was determined that the utilization of 4 major categories was appropriate for the analysis of collected data, namely – “scientifically acceptable
arguments”, “scientifically unacceptable arguments”, “not coded” and “no response”. The data under the category “scientifically acceptable arguments” were analyzed under two sub categories “full argument” and “part of the argument”. The explanations of those categories are as follows:

- **Scientifically Acceptable Arguments:**
  - Full Argument (FA): Responses which explain the concepts in the question in a fully scientific manner.
  - Part of Argument (PA): Responses which explain the concepts in the question in a partially scientific manner.

- **Scientifically Unacceptable Arguments:** The explanations which stay out of the scientific responses, they can be coded however they involve misconceptions, intuitive approaches.

- **Not Coded:** The responses which cannot be interpreted and are not related to the question. Also, reputational statements as the question are evaluated under this category.

- **No Response:** Those who did not provide any explanation.

The agreements and disagreements among the analyses of each researcher were compared and examined after the researchers made the analyses according to the same themes separately and individually. Quantitative comparison of the consistency between two researchers’ coding similarities and differences is a method which is appealed in qualitative researches (Yıldırım and Şimşek, 2008: 233). In the present study, inter-consistency coefficient for data analyses of two researchers was calculated according to the formula stated below (Novak, 1977):

\[ p = \left( \frac{N_a}{N_t} \times 100 \right) / N_t \]

In this formula, \( N_a \) indicates the number of students who have been coded in the same way by both of the researchers; \( N_t \) indicates the total number of the students and \( p \) indicates the percentage of the consistency. The reliability of data analyses increases as \( p \) increases. Data analyses are reported to be reliable when the percentage of the consistency stays above 70% (Yıldırım and Şimşek, 2008: 233). Inter-consistency percentages for the analyses of each question and for the total of the analyses are shown in Table 2.

<table>
<thead>
<tr>
<th>Question No</th>
<th>( p )</th>
<th>( P_{avr} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>91.9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>89.2</td>
<td>89.2</td>
</tr>
<tr>
<td>3</td>
<td>86.5</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 2, it is seen that the inter-consistency percentages are above 80% in each data analyses and it is 89.2% for the total. Hence, it can be concluded that data analyses are reliable. Discussions were carried on between two researchers to arrive an agreement for the analyses in which researchers disagreed about. Thus, the distributions of the categories have been determined for data.

**FINDINGS**

The findings obtained from data collection instrument are presented under related categories with sample student responses to illustrate those categories in the form of tables.

**The Findings Obtained from the First Question**

The findings obtained from the question, “The doctor gives Ayşe 2 different creams for the treatment of her acne on her face. He tells Ayşe to apply one of the creams on day time while the other one during only night time by adding that otherwise it might cause spots on her face. How can you explain this situation?” are shown in Table 3.
Table 3: The Analysis of the First Question

<table>
<thead>
<tr>
<th>Categories</th>
<th>Scientifically Acceptable</th>
<th>Scientifically Unacceptable</th>
<th>Not Coded</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FA</td>
<td>PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>19</td>
<td>9</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Sample</td>
<td>Night cream is not</td>
<td>The structures of both</td>
<td>The cream is</td>
<td>?</td>
</tr>
<tr>
<td>Response</td>
<td>applied on face during</td>
<td>dreams are different.</td>
<td>imitation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>day time because several</td>
<td>The interaction of two creams</td>
<td>I think the first</td>
<td></td>
</tr>
<tr>
<td></td>
<td>substances react with sun</td>
<td>with sun light is different.</td>
<td>treats while the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>light.</td>
<td></td>
<td>second one</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night cream goes on</td>
<td></td>
<td>decreases the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reaction with sun light</td>
<td></td>
<td>side effects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if it is applied on day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>time.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For this question, scientifically acceptable arguments were obtained from most of the students (n=28). No scientifically unacceptable arguments were obtained. The excess of scientifically acceptable arguments are full arguments (n= 19). Among the full argument responses, it was determined that the students could provide explanations by making connections between sun light and chemical reaction for the cream which needs not to be applied on face during night time. In part of arguments (n= 9), it was assessed that the students could make connection with only one of the concepts in their explanations. For example, if they mentioned sun light in their response, they failed to use the concept of chemical change clearly. For the category – not coded (n=4), it was defined that the students made various interpretations which are distant from scientific approaches. Five students did not respond to the question.

The Findings Obtained from the Second Question

The findings obtained from the question, “The pharmacist explains Ali how to prepare the cough syrup by mixing it given by the doctor and asks Ali to keep the syrup in its black bottle with its cap closed. What might be the reason of the pharmacist for this request from Ali?” are demonstrated in Table 4.

Table 4: The Analysis of the Second Question

<table>
<thead>
<tr>
<th>Categories</th>
<th>Scientifically Acceptable</th>
<th>Scientifically Unacceptable</th>
<th>Not Coded</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FA</td>
<td>PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>10</td>
<td>14</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Sample</td>
<td>The sunlight may cause</td>
<td>The medicine might lose its</td>
<td>To avoid</td>
<td>-</td>
</tr>
<tr>
<td>Response</td>
<td>chemical reaction. If its</td>
<td>chemical property.</td>
<td>seeing what</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cap is not closed, it can</td>
<td>It is needed to close its cap</td>
<td>is inside it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>go on reaction with the</td>
<td>and absorb light to keep it</td>
<td>Because glass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>air. To avoid the syrup</td>
<td>in room temperature.</td>
<td>means health.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>going on reaction with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sun light and air.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the second question, usually scientifically acceptable arguments (n=24) were obtained from the students. However, among those responses, the amount of part of arguments (n=14) were found to be more than the full arguments (n=10) who explained that the medicine had to be kept in that way in order to avoid its contact with air and sun light and avoid its spoiling. Besides, the students who related that case with concepts other than chemical change were assessed under the category – scientifically unacceptable responses (n=8).
interpretations other than scientific approaches were included under the category – not coded (n=3). Two students did not respond to the question.

The Findings Obtained from the Third Question
The findings obtained from the question, “Mine observes that the golden earrings, which she has been wearing for a year, keep its shining whereas the silver earrings have tarnished. How do you explain this case?” are demonstrated in Table 5.

Table 5: The Analysis of the Third Question

<table>
<thead>
<tr>
<th>Categories</th>
<th>Scientifically Acceptable</th>
<th>Scientifically Unacceptable</th>
<th>Not Coded</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FA</td>
<td>PA</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Sample Response</td>
<td>Gold is not oxidized but silver is oxidized.</td>
<td>The structure of golden earring is not prone to decaying.</td>
<td>Silver is less resistive when compared to gold. Gold is more resistive.</td>
<td>Presumably, the rings are false.</td>
</tr>
<tr>
<td></td>
<td>Oxidation is a chemical process.</td>
<td>The structure of silver cannot keep itself.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

About half of the students (n=17) responded to the third question in a scientifically acceptable way. Among those responses, the arguments, which indicated the fact that oxidation situation might differ since gold and silver were different matters, or their color change might differ due to that reason, were assessed under the category FA (n=10). The arguments which tried to highlight that gold and silver were different kinds of matter but did not make clear connection with the concept of chemical change were collected under the category – PA (n=7). Further, several responses such as “gold is more powerful”, “gold is more resistive” were found out among the findings. The arguments which explained the case in the question with the concepts “powerful/powerless”, “resisting/unresisting” were included under the category – scientifically unacceptable arguments (n=16). Among scientifically unacceptable arguments, one student was found to make an explanation in the following way: “Silver becomes moldy due to the fact that it is ordinary.” Such an explanation indicates us that becoming moldy and rusty (oxidation) are two concepts which are confused by the students; in another words, it indicates a misconception. About half of the students were seen to provide scientifically unacceptable arguments. Similar to the previous findings, several not coded arguments (n=2) were obtained in addition to 2 students who did not answer the question.

DISCUSSION AND CONCLUSION
As a result of this study, it was determined that the proportion of scientifically acceptable arguments provided by the students for the cases given them is more than scientifically unacceptable arguments. This is a nice result which shows that the students, who have been determined to be gifted, connect daily life issues with science and make explanations in a scientific manner successfully. Thus, as indicated previously, one of the fundamental goals of science education, making students realize the place of scientific concepts in daily life (Çepni, 2011: 9) can be achieved.

When the questions in data gathering instrument are analyzed, it is clear that the proportion of scientifically acceptable arguments given by the students show a decrease as the provided cases move from general to more specific. This situation – general/specific cases in the questions can be explained as follows: In the first question, the contact of the medicine with sunlight is considered whereas in the second question, the contact with both sunlight and air in terms of taking precaution is considered. In the third question, on the other hand, the students’ connection of chemical change with different structure matters by considering those matters as different elements is expected. This consequence demonstrates a parallelism with a previously conducted study finding in the literature (Doğan, 2007). In Doğan’s study, SAC students, who attended the study, were determined to be more successful in the macroscopic properties of matter about vaporization, condensation
and boiling when compared to the properties which cannot be realized with naked eye or microscopic properties and daily life explanations which required making various connections. Those consequences point out the significance of questioning in education. It is necessary to make students ask questions and encourage class debates despite passing the subjects and concepts superficially. One characteristic of gifted students is the fact that they ask interesting questions about the subjects (Dağlıoğlu, 2014: 60). Surely, satisfactory explanations during such dialogs provided by the teachers to the questions of gifted students are beneficial in terms of increasing the learning curiosity of them. Thus, the opportunity of touching more detailed and specific points during instruction might be gained.

In order to be more beneficial for gifted students, workshops, seminars, in-service trainings can be provided for SAC teachers by the National Ministry of Education in the country wide. In those activities, what the teachers can make in order to raise the effectiveness of their instruction in SACs can be discussed. In addition, sample cases might be presented. Thus, SAC teachers can find an opportunity to share their ideas although there is no obligatory teaching program to be applied one to one. The teachers can be made aware of the innovations also in this way. So, the development of SAC teachers might be supplied.

The 7th grade level gifted participants of the present study have been attending their SACs for about 4 years. Due to this reason, those students have acquired the facility to observe various events, make experimentations and gain higher level knowledge and abilities. At this aspect, it is important to serve a qualified education opportunity for all SAC students. Accordingly, one reason of this education is the improvement of the levels of conceptual understandings of the students. For this reason, if we move from the results of the present study, the levels of conceptual understandings of the students should be considered during the design of teaching activities for these students. However, unfortunately, no sufficient study is present related to that field. There is a need for more studies to find out the conceptual understandings of the gifted students related to different concepts in addition to the present studies in the literature (Doğan, 2007; Vural, 2010). Thus, a more efficient education process can be conducted in SACs which own a significant role in the education of gifted children by improving students’ conceptual understandings correctly about chemistry.

Similarly, conceptual understanding tests can be beneficial for educators during the processes of designing and preparing more qualified activities by finding out how students connect the scientific concepts with daily life issues. Conduction of the instruction relevantly is a situation which has been addressed in the literature (Holbrook, 2005; De Jong and Talanquer, 2015: 11). What is more, the activities which have been designed and prepared in this way contribute to the improvement of the students’ conceptual understandings.

**WJEIS’s Note 1:** This study is a part of Handan Ürek’s PhD dissertation.

**WJEIS’s Note 2:** This article was presented at 4th World Conference on Educational and Instructional Studies-WCEIS, 05-07 November, 2015, Antalya-Turkey and was selected for publication for Volume 6 Number 1 of WJEIS 2016 by WJEIS Scientific Committee.

**REFERENCES**


FLIPPING THE DRAWBACKS OF FLIPPED CLASSROOM: EFFECTIVE TOOLS AND RECOMMENDATIONS

Betül Aydın  
Süleyman Demirel University  
TURKEY  
betulaydinlive@gmail.com

Veysel Demirer  
Süleyman Demirel University  
TURKEY  
veyseldemirer@gmail.com

Abstract

Although flipped classroom is a new pedagogical model, it has emerged frequently in recent years. In this model, low level skill ‘knowledge acquisition’ is allocated to the students. Such activities that require high-level skills as application and problem solving are carried out under the guidance of teacher. When the relevant literature reviewed, many studies examining the definition, advantages and disadvantages of this model, experimental studies and model applications have been found. However, such resources compiling and introducing tools can be used to make the flipped classroom model effective and overcome disadvantages.

When the relevant literature reviewed, many studies examining the definition, advantages and disadvantages of this model, experimental studies and model applications have been found. However, such resources compiling and introducing tools can be used to make the flipped classroom model effective and overcome disadvantages.

The present study provides information about the tools which can be used in any stage of the flipped classroom model and introduce these tools in detail with the aim of filling the deficiencies. Moreover the selected instruments are evaluated in terms of their compatibility with mobile technologies. Literature review method was used in the study. In this context, particularly disadvantages of the model have been identified in the literature area and it addressed the means to overcome these limitations. Also, content analysis data that were compiled between the years 2010-2015 was carried out in the framework of flipped classroom models are also used in this study. This aspect of the research is like a guide that enables flipped classroom enhanced by mobile technologies which are necessary for learning in times of need, time and place independent. Through offered mobile learning-oriented information, learner’s needs will be met. In this context, tools for eliminating the disadvantages of this model discussed in the relevant literature are selected in particular. It is expected that this study takes a guide role for the educators who want to apply flipped classroom model.

Keywords: Flipped Classroom, Learning tools, Web-based tools, Mobile technologies.

INTRODUCTION

Traditional education has started to become inefficient due to the changing needs of individuals in 21st century. The integration of technology into the pedagogic models developed for these needs of individuals has almost become compulsory. Flipped classroom model is one of these models that has been developed as new methods have been required in order to fulfill the needs for higher order skills in the learners’ lives (Sams & Bergmann, 2013). This is a new pedagogic model which leaves the responsibility of learning—lower order skill—to the learner and requires higher order skills such as practice and problem-solving to be handled in the class under the guidance of the teacher. In this way, contrary to traditional education, teachers create new environments in which students can enhance their practical skills, abilities to transfer new knowledge,
productivity, cooperation and interaction skills and do group work (Missildine, Fountain, Summers & Gosselin, 2013). Flipped classroom model has two phases. In the first phase learning takes place individually with the help of technology outside the class, while in the second phase learning occurs with communicative group activities inside the class (Bishop & Verleger, 2013). Homework in traditional education turns into in-classroom activities in this model. As in this study, a comprehensive literature review was conducted by the researchers. Several experimental studies demonstrate that this model has positive effect on academic achievement, motivation, problem solving skill and application skills, critical thinking skills, self-efficacy, attendance, perceptions and attitudes.

Flipped classroom model has disadvantages just as many pedagogic methods. Some of the disadvantages indicated in literature can be listed as follows. First of all, learners who adopted traditional education may resist to this new model (Herreid & Schiller, 2013). Developing or supplying communicative classroom materials such as videos during the implementation process of the model can be found too demanding by the teacher or instructional designers (Effield, 2012). Researchers (Ash, 2012; Riveraa, 2015; Sams & Bergman, 2013; Thom, 2012) have stated some of the problems that teachers encounter in this model. Teachers can be suspicious about whether the students are watching the videos or not and may find interaction during the individual learning processes insufficient. Also, the students who come to school without watching the course content while others are doing the in-classroom activities and students’ different speed rates in the activities can be problematic for the teachers, since while the early finishers will get bored, the others may feel frustration. Moreover, teachers may have doubts about whether students acquired the new knowledge during the video sessions because of insufficient feedback.

The Current Study
The aim of this study is to present materials and effective recommendations in order to eliminate the disadvantages of flipped classroom model stated in the literature. Unlike many other pedagogic models, flipped classroom model requires technology integration particularly communicative video materials. As a result of the literature review, several experimental research conducted on various sample groups have been encountered. However, studies have been found to be insufficient in terms of compiling and introducing the materials to make flipped classroom model effective and eliminate the disadvantages. Based on this deficiency, various materials are introduced below in order to guide teachers who want to use flipped classroom model and researchers who study this model. These materials are evaluated according to their compatibility with mobile devices. These tools have been identified with content analysis method from the studies conducted on flipped classroom model between the years 2010 and 2015. Along with this data, some other materials that are found to beneficial for the researchers are introduced and their features are presented.

In this study, the related literature has been reviewed in order to identify the disadvantages of flipped classroom model. The use of technology has been foreseen to eliminate these disadvantages and effective tools have been compiled. In the selection of these effective tools, research done between the years 2010-2015 have been reviewed and content analysis has been conducted. The key words “Flipped Classroom”, “Flipped Education” and “Flipped/Inverted Learning” were used in the search from ProQuest Dissertations and Thesis Full Text Data Base, and Turkey Thesis Catalogue. As a result of the search 28 MA and PhD thesis - written in Turkish (f=2) and English (f=26) - were reached. Tools used for various reasons such as constructing course content, sharing course content, evaluation, enhancing interaction, reinforcing knowledge and increasing the interaction between peers as well as students and teacher are shared. The frequencies of these tools have been calculated according to the studies previously used. The frequencies of these tools are presented in the Table 1.

As a result of literature review and content analysis, the tools used in this model have been examined under four sub-titles: Content preparation process, source searching process to access the course contents, content sharing process and providing interaction.
Table 1: Content Analysis Data: Tools Used in Flipped Classroom Model

<table>
<thead>
<tr>
<th>Process</th>
<th>Tool</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source searching</td>
<td>TED Talks</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Khan Academy</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Teachertube</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bright Storm</td>
<td>1</td>
</tr>
<tr>
<td>Content Preparation</td>
<td>Camtasia Studio</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>PowerPoint</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Screencast-O Matic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PDF Converters</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Prezi</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SmartRecorder</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ShowMe</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Educreations</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>GoAnimate</td>
<td>1</td>
</tr>
<tr>
<td>Content Sharing</td>
<td>YouTube</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Podcast&amp;Vodcast</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Google Docs</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Blackboard</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Moodle</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Dropbox</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sakai</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Schoology</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Canvas</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Edmodo</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Google Hangout</td>
<td>1</td>
</tr>
<tr>
<td>Providing Interaction</td>
<td>Quiz Applications</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>MyMathLab</td>
<td>1</td>
</tr>
</tbody>
</table>

The tools that are found to be appropriate to the model have also been presented in the table along with the other tools. Process-driven investigated studies have been stated with suggestions. In the current study, tools and suggestions were given under two sub-titles: A) content preparation and B) content sharing. The tools given in the table that are used for different aims have been presented by integrating them under these two processes.

A. The Process of Course Content Preparation

In this process, teachers prepare course content that provides learner acquiring the necessary knowledge before the lesson. These contents can mostly be videos as well as interactive presentations and source links explaining the subject. Suggestions for the teacher in this process and tools have been presented below.

One of the main conditions of the course efficiency is the sufficiency of sound and image quality of the video. Poor sound and low resolution may obstruct the perception and cause distractibility in students. Interactivity in videos is important, because the aim of flipped classroom model is not just shooting course videos, but also increasing the participation levels of students to the highest levels (Bergmann and Sams, 2014). It is necessary to highlight the important expressions with various tools in course content during this process. It is possible to feature the important points with different shapes, colors and fuzzification techniques. The display of course content on mobile devices can make the learning process more fruitful by setting it free from time and place. The learning process is individualized as a result of supporting flipped classroom model with mobile learning and the interaction between learner-teacher and learner-learner is reinforced (Al-Fahad, 2009). The teacher can make use of many tools in the market while preparing the course content by providing the conditions. However, in this study, the tools that got most attraction have been included based on their download frequencies.
A.1. Camtasia Studio
Camtasia Studio is used to record the teacher’s computer screen. Via this software, learning elements can be more effective with background images, motion graphics, speech bubbles, zooming, to enrich content. With various elements such as table of contents, links, search button and questions it is possible to make interactive course content (E-Data, 2013). For more efficient learning, it is crucial to watch the video prepared in many devices. Prepared with Camtasia Studio videos can be viewed on different devices. Also these contents can be shared on different platforms. Camtasia Studio is a paid software developed by TecSmith company. However, 30-day trial version is available.

A.2. Adobe Captivate
This software is a tool that can be used to prepare interactive e-learning content is compatible with many devices. It may be preferable for teachers using the flipped classroom model aspect to allow mobile learning and interactive content preparation. This software can convert Microsoft PowerPoint presentation to HTML5-based e-learning content. Due to prepare quizzes and interactivity options, this software may prefer by trainers who use flipped classroom model. Adobe Captivate allows projects to be published in various media such as Youtube, desktop and learning management systems (LMS). This software provides opportunities for high-resolution recording will avoid possible attention disorders among students following the course.

A.3. Screencast-O-Matic
Unlike other screen casting softwares, Screencast-O-Matic allows teachers online video recording without installing setup. Because of the ease of use, it may be preferred by the person who prepares the course content. This platform is free for 15-minute videos. Bergman and the Sams (2013) stated that video contents should be given in simple and presented in an understandable format. From this point video should not be too long. If the content is long, video content should be divided into short pieces. When all this is taken into account, free time offered by this software will be sufficient. Also, Screencast-O-Matic allows high-resolution video to be posted on Youtube easily. Some of the possible situations that may prevent the processing effectively the flipped classroom model are file size and server capacity. However, Screencast-O-Matic can share videos Youtube. This will provide following lessons on different platforms anywhere with internet access. So it is sufficient just sharing the link.

Moreover, to eliminate limitations such as file size and server capacity, teachers may share contents in different formats. For example, related pictures can be saved in the pdf or image format with screenshot tools. Many software can be found on the market. Some of them listed below. They allow users to add highlighting and guidance on screenshot photos. The more widely used of these devices are discussed below.

A.4. Screen Shoot Mobile Applications
Screencast mobile applications on derivatives on the market can take the display screen of the mobile device and share on various platforms. Thus, trainers can provide rapid feedback to students in the flipped classroom implementation process. These tools may be preferable to increase the applicability of flipped classroom model on the mobile environment.

A.5. Lightshoot Desktop Application
Unlike many screen shooting software, it allows users to add highlight and orientation elements. Also Lightshoot converts contents to online connections. In this way teachers can share these links with students easily. The software is free and can run on Mac and Windows operating systems. It is not necessary to install.

A.6. Educreations
Educreations can be preferred to increase the interactivity and mobility properties of flipped classroom model. Image of the interactive whiteboard screen can be saved with this mobile application.

Teachers can create course content quickly with some features such as voice recording, listening again, drawing and handwriting. In addition, learning contents can be shared on Dropbox, Google Drive, social networks. Educreations provides the safety of the data through cloud system (Educreations, 2015). This software can be
downloaded for free but it has also professional version for different features. Easy simple interface offers the possibility of practical use. The limitation of this application is only available on iOS support.

B. Identifying Learning Platforms for Access to Course Contents

At this stage, the teacher chooses the best platform for his/her teaching strategy in order to make the lesson more effective and ensures the students enroll the platform. It is important to be careful about the accessibility of the system from different platforms and have a plain and user-friendly interface. It is necessary to adjust active teaching methods effectively to these settings when the effect of methods used in teaching on achievement is taken into consideration during the process of knowledge acquisition via these platforms (Gülbahar & Kalelioğlu, 2009). From this aspect, choosing the systems that enable creating question-answer platforms will provide teacher-student and student-student interaction. In order for evaluation, the most important phase of the system, it should be paid attention that the system has evaluation tools. The identification of whether the target outcomes have been reached at the end of the model (Bozkurt, 1995), and controlling the productivity during the process are important for evaluation. Various platforms and tools have been evaluated taking these conditions into consideration in order to guide teachers in this process.

B.1. Edpuzzle

EdPuzzle, which can be used for both content preparation and sharing, is an online platform that helps you make your videos prepared for the lesson more effective and beneficial. Teacher can add sound to the video as well as recording his/her own voice on it. Moreover, it is possible to add questions to the video in order to make the lesson more interactive. The platform that reports the answers of the learners to the teacher contributes to the evaluation process of the teacher. This content is assigned to the selected class. There are features of this platform specifically developed for flipped classroom model. One of the disadvantages of flipped classroom model is that the teacher cannot be sure whether the students watch the video or not. EdPuzzle can help teachers check whether the students watch the video. The software does not allow its users to skip the video while watching it. If a learner opens another tab during the video, it stops automatically. The video is not only watched on the prepared platform. The content can be integrated many other platforms. It does not always have to be the teacher who prepares the videos. Students may also be included in the video-making process. In this way, students’ creativity will enhance and they will be integrated more to the lesson. Students can use the tools without any difficulty, since it is easy to use them. These features increase the prefer ability of the platform.

B.2. Edmodo

Today, many learning management systems are used by universities and institutions in order to make education activities more efficient. Edmodo may be considered as "social learning platform," rather than as learning management system. Because it’s working the logic is similar to social networks’ working logic. Edmodo can work with IOS and Android-based mobile applications. Communication and cooperation dimension in the learning process are necessary for positive educational outcomes (Topping, 2005; Barkley, Cross, & Major, 2005). Of course teachers must use these dimension in the process of implementing the flipped classroom model. Edmodo has features that serve these dimensions. Thanks to a given group code students can be monitored by parents and teachers. Contents that prepared by students shared in a group setting. Intra-group messaging can enhance classroom interaction.https://www.edmodo.com/

B.3. Moodle

As can be understood from the concept of opening, Moodle (Modular Object Oriented Dynamic Learning Environment), is a flexible object-oriented dynamic learning environment (Moodle, 2010). Moodle can run on operating systems with support for PHP such as Windows, Mac, Linux. Moodle is free open source learning management system and can be used by students and administers easily. It is often preferred for these reasons. Because of iOS and Android-based Moodle mobile applications and feature to allow the quiz, it may be preferred by instructors.
B.4. BlackBoard

Blackboard is free if the institution has license. Otherwise it can be accessed for a fee. According to result of content analysis, blackboard is preferred by many trainers in the implementation process of the flipped classroom model. This platform is functional via mobile support. Blackboard provides the storage, editing and sharing of learning content. Also, it is easy to use (Beatty & Ulasewicz, 2006). Via e-portfolio property it allows assessment of process and students. In addition, Blackboard makes the course interactive allowing for discussion and examination.

B.5. Quizzes

Herried and Schiller (2013) indicated that students may come to school unprepared in implementation process. To solve this problem, quizzes can be put to work in flipped classroom model. In addition to the many benefits quizzes allow Just-in-Time learning (Novak, 1990). Brame (2013) stated that quizzes are required to identify areas where students need help. Clipchoos to, Smile, Quiz Slide, Testmoz, Socrativ to, Thatquiz, Classroom Marker, Gotoquiz, Quizst and Edmodo are some tool that can be preferred for this purpose. Teacher can prepare questions about the selected course content and they can define their answers. With these tools learners can challenge their peers on social networks. By this way lesson becomes fun and interactive. Students evaluate themselves while reinforcing their information.

DISCUSSION AND CONCLUSION

Time can be allocated for in-class problem solving, cooperation and activities supporting complete learning with the help of flipped classroom model. This pedagogic model enables learners to build their own knowledge (Bradford, Muntean & Pathak, 2014). Compared to other pedagogic models, there is more need to technology integration in the implementation process of this model. As a result of literature review, it has been found out that the activities used during the implementation of the model are not limited and many active learning activities can be included to this process. In this regard, the selection of tools will directly affect the efficiency of the model. There are various studies in the literature that state the effectiveness of digital technologies in the development of 21st century knowledge and skills (Fassbinder, Moreira, Cruz & Barbosa, 2014). It has also been stated in these flipped classroom model studies that peer interaction, question-answer method and the use of quizzes are necessary to be used. Some important difficulties and problems may be disclosed during the process prepared by integrating conceptual questions in peer-integrated learning (Mazur, 1997). The selection of these kind of interactive teaching methods can also eliminate the doubt in whether the learning will take place or not—one of the disadvantages of the model- to a great extent.

Tools that can be preferred in order to eliminate the limitations of the flipped classroom model have been presented in this study. The clues to which tool will be more useful in which stage of the model have been stated. The software programs and prepared contents chosen in this model should be accessible for teacher and students via various devices (Kharat, Josh, Badadhe, Jejurikar & Dharmadhikari, 2015). Content development operative in various platforms has been aimed by taking these into consideration in order to enhance the accessibility of the educational implications. In this regard, this study is aimed to serve as guidance for teacher who wants to use flipped classroom model in their lessons. In the studies reviewed, the necessity of the selection of tools such as quizzes and debates that enhance interaction has often been encountered. In this respect, using tools addressing many senses and integrating more students to the learning process are foreseen as more beneficial to the process instead of power point presentation.

The selection of tools that report the download and monitoring process of the learners in the implementation process of flipped classroom model will lead to the integration of learners into the process of knowledge acquisition. Furthermore, using social networks will contribute to the teacher-student and peer interaction in this process. Platforms that are integrated to social networks individualized and cooperative plays conditioning role in teaching and learning processes (Fassbinder et al., 2014).

This study has presented the tools that make the knowledge acquisition process as a lower order skill productive and interactive. It is important to keep in mind that, these tools serve the purpose of the process of content preparation and presentation, and do not include in-classroom structural learning activities. If the
model's main purpose of sparing more time on in-classroom structural learning activities is considered, it can be stated that great amount of research is still needed for in-classroom processes. Since flipped classroom model is a relatively new pedagogic model, there is a need for further research. This study only investigated the software used in the previous studies, and hardware aspects were not taken into consideration. Further research can include the beneficial hardware that can be used in this model.

REFERENCES


Effield, J. (2013). Looking at the impact of the flipped classroom model of instruction on undergraduate multimedia students at CSUN. *TechTrends*, 57(6), 14-27.


TEACHERS’ OPINIONS ON THE INFORMATION TECHNOLOGY COURSE AND INFORMATION TECHNOLOGY TEACHER

Alper Aslan
Tunceli University
TURKEY
alperaslan@gmail.com

İdris Göksu
Mardin Artuklu University
TURKEY
idrsgokus47@hotmail.com

Assoc. Prof. Dr. Bünyamin Atıcı
Fırat University
TURKEY
batici@firat.edu.tr

Abstract
It is inevitable that developments in technology affect learning-teaching processes as well, just like in all fields. What is expected from today’s schools is to raise individuals who are equipped with the skills of access to information and use it in an effective way and can use the technology. Teachers and school administrators play a very important role in using technology in the most productive way at the schools. This study is conducted in order to determine opinions and expectations on information technologies (IT) course at elementary schools and the roles of IT teachers who run these courses at the schools. To that end, data was collected through face-to-face interviews with 37 teachers and 3 administrators using the interview method. A total of 9 open-ended questions which were prepared with expert’s opinion were addressed and the opinions received were transferred to an electronic medium by the researcher. Descriptive analysis method was used to analyze these opinions. During the analysis, sub-themes were created using the opinions and they were presented in tables.

Keywords: Information technologies teacher, information technologies class, teacher.

INTRODUCTION

Developments in science and technology have a substantial influence on the size of information as well as the way and speed of access to information. This reality causes a transformation in educational environments and teaching methods. Teachers, who have an important role in educational process, have also become a significant part of this transformation and need to continuously keep up with the technology and incorporate new developments into educational settings. Dursun and Çuhadar (2009) states that developments in technology make it necessary to raise individuals who have the skills to use information and communication technologies.

Today, schools aim to develop individuals who can access to information and use the information in an effective way (Akkoyunlu and Kurbanoğlu, 2003). It can be argued that it is important to use the technology effectively and individuals should be raised in a manner they are familiar with the technologies (Çepni, 2005). This duty is fulfilled by IT teachers at the schools (Kabakçı and Odabaşı, 2007). Also, the Ministry of National Education (MEB) assigns this task to the IT teachers (MEB, 2015). Other than these defined duties, there are expectations from IT teachers as well (Seferoğlu and Akbıyık, 2007). At times, legal responsibilities of IT teachers and other duties expected from these teachers at the school environment interfere with each other and this leads to problems. Thus, it is important to reveal the opinions of teachers in order to clarify this situation.
There has been an increase in the studies conducted on IT teachers and IT courses. Erdoğan et al. (2010) aimed to find out IT class management and classroom discipline problems; kıyıcı and Kabakçı (2006) to reveal professional qualifications and working conditions of teachers; Durdu and Yıldırım (2005) to present the education received by teachers; and Dursun and Çuhadar (2009) to identify the problems encountered by teachers. As a result of these problems, the main problems in order of priority include managerial problems, teaching problems, technical and infrastructure problems and personal problems.

**METHOD**

**Aim of the Study**

This study aims to reveal opinions and expectations of teachers on IT courses offered at elementary schools and the role of IT teachers at the schools.

**Research Model**

In this study, qualitative research method was adopted in order to determine opinions and expectations on information technologies (IT) course at elementary schools and the roles of IT teachers who run these courses at the schools. Qualitative research is a research in which qualitative data gathering methods like observation, interview and document analysis are used and a qualitative process aimed at introducing the perceptions and events in a natural environment and in a realistic and integrative way is followed (Yıldırım and Şimşek, 2011). In this study, the case study was used as a qualitative research method. Case study is a research approach where a phenomenon or its one or two examples are studies in depth (Yıldırım and Şimşek, 2011). In case studies, researchers should determine a case or cases which include an individual, an event or an activity (Patton, 2002; Creswell, 2013).

**Population and Sample**

Population of the study consists of school administrators and teachers who work at elementary and secondary schools. Sample of the study includes 3 school administrators and 37 teachers who work at an elementary school and secondary school. In the selection of sample, convenience sampling method was used from among the non-random sampling methods. The purpose of choosing convenience sampling method is to bring in speed and practice in the sample. Demographics of the sample are given in Table 1.

Table 1: Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>N</th>
<th>40</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>27,78</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>16,67</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>20</td>
<td>26-30</td>
<td></td>
</tr>
<tr>
<td>36-40</td>
<td>36</td>
<td>41-11</td>
<td></td>
</tr>
<tr>
<td><strong>Duty</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>37</td>
<td>41,11</td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>3</td>
<td>3,33</td>
<td></td>
</tr>
<tr>
<td><strong>Field</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom Teacher</td>
<td>26</td>
<td>28,89</td>
<td></td>
</tr>
<tr>
<td>Turkish Teacher</td>
<td>5</td>
<td>5,56</td>
<td></td>
</tr>
<tr>
<td>Science and Technology Teacher</td>
<td>2</td>
<td>2,22</td>
<td></td>
</tr>
<tr>
<td>Mathematics Teacher</td>
<td>2</td>
<td>2,22</td>
<td></td>
</tr>
<tr>
<td>English Teacher</td>
<td>2</td>
<td>2,22</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>2,22</td>
<td></td>
</tr>
</tbody>
</table>

**Demographics**

| Sex | Male | 27,78 |    |
|     | Female | 16,67 |    |
| Age | 20-25 | 26-30 |    |
| Duty | Teacher | 41,11 |    |
|     | Administrator | 3,33 |    |
| Field | Classroom Teacher | 28,89 |    |
|      | Turkish Teacher | 5,56 |    |
|      | Science and Technology Teacher | 2,22 |    |
|      | Mathematics Teacher | 2,22 |    |
|      | English Teacher | 2,22 |    |
|      | Other | 2,22 |    |
Data Collection and Analysis

During the data collection process, face-to-face interviews were held with teachers and school administrators who were in the determined sample. Interview is an effective method used to reveal one's real thoughts and assess the situation that is dealt with his point of view (Patton, 1987). In the face-to-face interviews, semi-structured questionnaires were used. The questionnaires were prepared by the researchers and then revised after obtaining an expert's opinion. Face-to-face interviews were held with teachers and school administrators using these semi-structured questionnaires and 9 questions were asked to the participants. With these questions, it was aimed to determine the current situation, problems experienced and expectations about the IT course and IT teachers. The interviews were transcribed by the researchers. Then the data obtained were analyzed using the descriptive analysis method and presented in tables.

FINDINGS

In this section, descriptive analysis results of the questions that were asked to participants during the interviews in order to find answers to research questions are provided. Firstly, descriptive analysis results of the data which was obtained during the interviews in relation to skills that IT teachers should have are presented in Table 2.

<table>
<thead>
<tr>
<th>Interview question: Which skills do you think IT teachers should have?</th>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Having sufficient knowledge and skill in IT</td>
<td></td>
<td>27</td>
<td>67,50</td>
</tr>
<tr>
<td>2. Keeping up with new technologies and innovations</td>
<td></td>
<td>19</td>
<td>47,50</td>
</tr>
<tr>
<td>3. Being able to transfer and share a knowledge of his field</td>
<td></td>
<td>10</td>
<td>25,00</td>
</tr>
<tr>
<td>4. Supporting students in effective use of IT and making research online</td>
<td></td>
<td>8</td>
<td>20,00</td>
</tr>
<tr>
<td>5. Having pedagogical knowledge about developmental periods of children</td>
<td></td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td>6. Having social skills and being active in social relations</td>
<td></td>
<td>4</td>
<td>10,00</td>
</tr>
<tr>
<td>7. Being creative</td>
<td></td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td>8. Speaking English</td>
<td></td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td>9. Raising the awareness of and training teachers about IT</td>
<td></td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>10. Being competent in design and programming</td>
<td></td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>11. Being competent in developing educational materials using technological software</td>
<td></td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>12. Being courageous and fast</td>
<td></td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td>13. Being tolerant and patient</td>
<td></td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td>14. Having numeracy</td>
<td></td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td>15. Being curious</td>
<td></td>
<td>1</td>
<td>2,50</td>
</tr>
</tbody>
</table>

Table 2 indicates that having sufficient knowledge and skill in IT is the first skill that IT teachers should have according to school administrators and teachers. Secondly, keeping up with new technologies and innovations is considered among the skills that IT teachers should have. In addition, school administrators and teachers stated that IT teachers should transfer and share with their community any new developments in their field. In this respect, some of the opinions of participants are as follows:

“IT teachers should be equipped with necessary and sufficient knowledge about computers and other multimedia devices. Also, they should be aware of all innovations brought by the technology and keep up with the developing technology. They should tell the knowledge of their field to others and share what they know in a manner that others can understand depending on their level (K1, Classroom Teacher).”

“A progressive, modernist world view. An inquiring character who follows up the world of technology. He should be a curious person in parallel with those (K3, Classroom Teacher).”
“He should speak a foreign language. He should be closely interested in current events and technological developments. He should have a wide tolerance and patience and a practical intelligence and creative mind (K7, School Administrator).”

“He should know computer and many technological products very well. He should be able to lower himself to the level of students. He should closely follow up technological developments. He should be able to express good that technology is essential. He should be able to motivate students to develop technological designs (K24, Science and Technology).”

The descriptive analysis results of the opinions of school administrators and teachers on feedbacks that they receive when they ask IT teachers for support are given in Table 3.

Table 3: The support given by IT teachers to other branch teachers

<table>
<thead>
<tr>
<th>Interview Question: What kind of feedbacks do you receive when you ask for support about your branch?</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I usually get positive reaction when I ask for help</td>
<td>32</td>
<td>80,00</td>
</tr>
<tr>
<td>2. I couldn’t get the support I need</td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td>3. I’ve never asked for support</td>
<td>3</td>
<td>7,50</td>
</tr>
</tbody>
</table>

When the Table 3 is examined, it indicates that school administrators and teachers usually get positive reactions to their request of support from IT teachers. 32 of participants said that they get positive reactions from IT teachers, 5 said they can’t get the support they need, and 3 said they have never asked for a support. Regarding these findings, some of the opinions of participants are as follows:

“I get positive reactions as much as possible. Although it is not his task, he is devotedly trying to help (K6, Classroom Teacher).”

“Since my branch is maths, when I ask for support about math-related symbols or geometrical figures I get positive feedbacks (K10, Mathematics).”

Descriptive analysis results of opinions of school administrators and teachers on the requirement of IT teachers to create solutions for what kind of problems encountered at the school are presented in Table 4.

Table 4: Status of IT teachers in solving problems related to their field

<table>
<thead>
<tr>
<th>Interview Question: What kind of problems encountered at the school should IT teachers solve in your opinion?</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. About general computer use and technical problems</td>
<td>23</td>
<td>57,50</td>
</tr>
<tr>
<td>2. About the use of technological devices (projector, computer etc.)</td>
<td>10</td>
<td>25,00</td>
</tr>
<tr>
<td>3. Giving technical support and offering courses to teachers about computer technologies</td>
<td>6</td>
<td>15,00</td>
</tr>
<tr>
<td>4. He should be organized and effective about the use of IT classroom</td>
<td>4</td>
<td>10,00</td>
</tr>
<tr>
<td>5. I expect technical support about the preparation of presentation</td>
<td>4</td>
<td>10,00</td>
</tr>
<tr>
<td>6. Giving technical support to students during the IT class</td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td>7. Making instructional technologies ready for use</td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td>8. Guiding the administration about meeting the need for technological equipments at the school</td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>9. Introduction of new technologies</td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>10. Creating solutions for developing computer skills of students</td>
<td>1</td>
<td>2,50</td>
</tr>
</tbody>
</table>

Table 4 shows that there is a prominent perception that IT teachers should solve issues related to use of computers and technical problems at the schools. On the other hand, there is a dominant opinion that IT teachers should give courses and provide technical support for teachers and other school personnel about the use of technology. Some of these opinions are presented below:
“I want the IT teacher to help me in solving problems that I experience about IT (K16, Classroom Teacher).”

“Helping us in problems we experience about computers. Guiding students for access to websites about the class. Helping about the use of projector device (K24, Science and Technology).”

Table 5 shows that school administrators and teachers need IT teachers in providing technical support about software and technological materials that can be used for educational purposes and in solving potential technical problems. However, 9 participants said that they do not need IT teachers and they solve the problems by themselves.

Table 5: The need for IT teacher

| Interview Question: Do you need the IT teacher at your school about your branch? Why? |
|---|---|---|
|       | Yes | 31 |
|       | No  | 9  |

<table>
<thead>
<tr>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing technical support about software and technological materials that can be used for educational purposes</td>
<td>14</td>
<td>35,00</td>
</tr>
<tr>
<td>Solving potential technical problems</td>
<td>8</td>
<td>20,00</td>
</tr>
<tr>
<td>Raising the awareness of teachers about IT and technological innovations</td>
<td>6</td>
<td>15,00</td>
</tr>
<tr>
<td>Education that is offered with the help of technology would be more productive</td>
<td>3</td>
<td>7,50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I take care of it by myself</td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td>I think I have competence about this</td>
<td>4</td>
<td>10,00</td>
</tr>
</tbody>
</table>

Some of the opinions of participants in relation to the results of descriptive analysis given in Table 4 are as follows:

“Yes, because today education and teaching is more productive when it is supported with technology. And I need the IT teacher, more precisely that competency for my own field and development of my own class (K1, Classroom Teacher).”

“Yes, I do. Since the courses are more productive when they are offered computer-aided, we get help when using the computers. When we guide students to make a research, students access to information with the help of IT teacher (K24, Science and Technology).”

Table 6 presents the descriptive analysis results of opinions of school administrators and teachers on keeping IT teachers responsible for technical problems at the schools.

Table 6: Keeping IT teachers responsible for technical problems

| Interview Question: Do you think should the IT teachers be kept responsible for technical problems at the schools as well? Please explain its reason. |
|---|---|---|
|       | Yes | 19 |
|       | No  | 21 |

<table>
<thead>
<tr>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT teacher should guide and offer practical solutions but not repair</td>
<td>7</td>
<td>17,50</td>
</tr>
<tr>
<td>IT teacher should offer their course and provide educational support only</td>
<td>6</td>
<td>15,00</td>
</tr>
<tr>
<td>IT teacher should provide guidance for students about proper use of technology</td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td>IT teacher should make contribution about integration of technology into instructional environments</td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td>All personnel should have a knowledge enough to solve potential basic technical problems</td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td>Elimination of potential hardware or software problems</td>
<td>19</td>
<td>47,50</td>
</tr>
</tbody>
</table>
Table 6 indicates that teachers and school administrators stated that IT teachers have a role which offers practical solutions but does not repair and assume the task of a repairman. Slightly more than half of the participants argued that IT teachers should not assume the role of a repairman, while almost half suggested that they should solve hardware and software problems. Opinions of participants about this issue are presented below:

“We should use IT teachers in the area of education. Getting technical support from an electrical and electronic maintenance and repair network that is created by many schools with groups of ten or fifteen personnel will prevent costs and labor loss. People should not be sent to each school for technical support. A support group of 3-5 members that will offer service for 5-10 or 15 schools would solve this problem. (K7, School Administrator).”

After examining the opinions on responsibilities of IT teachers about technical problems, descriptive analysis results of opinions of school administrators and teachers on solving technical problems at the schools are presented in Table 7.

Table 7: Solution of IT-related technical problems at the schools

<table>
<thead>
<tr>
<th>Interview Question:</th>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adaptation of teachers and other personnel continuously to IT and its effective use, and in-service training</td>
<td>17</td>
<td>42,50</td>
</tr>
<tr>
<td></td>
<td>Having a computer technicians at each school (or several schools)</td>
<td>14</td>
<td>35,00</td>
</tr>
<tr>
<td></td>
<td>Introducing a solution in an organizational way</td>
<td>6</td>
<td>15,00</td>
</tr>
<tr>
<td></td>
<td>Having sufficient number of technological devices, and updating and renewing them</td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td></td>
<td>Procuring technical support service</td>
<td>5</td>
<td>12,50</td>
</tr>
<tr>
<td></td>
<td>Equipping all classes with technology</td>
<td>2</td>
<td>5,00</td>
</tr>
<tr>
<td></td>
<td>Developing solutions with projects by giving financial support to IT teachers</td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td></td>
<td>Increasing the number of IT teachers</td>
<td>1</td>
<td>2,50</td>
</tr>
</tbody>
</table>

When the Table 6 is examined, participants stated that teachers and other school personnel should be trained continuously on effective use of information technologies or technical problems at the schools should be solved by having a computer technician at the schools.

Lastly, the results of descriptive analysis on opinions of school administrators and teachers on the need for IT course.

Table 8: The need for IT course

<table>
<thead>
<tr>
<th>Interview Question:</th>
<th>Opinions</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do you think the IT course is necessary? Please explain its reason.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opinions</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>It gives students the opportunity to know and use computer technologies effectively</td>
<td>17</td>
<td>42,50</td>
</tr>
<tr>
<td></td>
<td>It enables keeping pace with computer literacy and technological developments as required by our time</td>
<td>15</td>
<td>37,50</td>
</tr>
<tr>
<td></td>
<td>The number of courses should be increased</td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td></td>
<td>IT course should be compulsory</td>
<td>3</td>
<td>7,50</td>
</tr>
<tr>
<td></td>
<td>Instead of IT course, all teachers should be competent in IT</td>
<td>1</td>
<td>2,50</td>
</tr>
<tr>
<td></td>
<td>All classes should be equipped with technological devices instead</td>
<td>1</td>
<td>2,50</td>
</tr>
</tbody>
</table>
Table 8 shows that majority of participants stated that IT course is necessary. In addition, 17 participants said that IT course should be offered to make sure students know and use information technologies effectively. Regarding these findings, some of the opinions of participants are as follows:

“I think it is absolutely necessary. We are living in the age of technology. Students should receive necessary IT education in order to keep up with the times and have easier access to information (K30, Religious Culture and Moral Knowledge).”

“The IT course is not only for students to move with the times. It is also necessary to prevent them from seeing computer as a machine to share socially using the Internet or play games only. It is nothing but nonsense that students who have computer literacy are all perceived as they are like that. It is certain that the computer skills of elders who would say "Somehow the kids use it very well. They even use the computer better than me" are seriously in a arguable situation. I think that we should ask a question like "We know how to read and write anyway, then why do we have Turkish class, literature class or grammar class and why are they compulsory?" to people who think like that. If we consider their answers in the context of IT branch, I think we could find out many reasons (K32, Classroom Teacher).”

CONCLUSION AND RECOMMENDATIONS

When the findings that were obtained in line with the purpose of this study, it is found out that the most important aspect regarding the skills that IT teachers should have is having sufficient knowledge in their field. Also, it is observed that opinions are concentrated on sub-themes such as the IT teacher following up technological developments, being able to transfer his knowledge, having social skills, having competency in developing instructional materials and having pedagogical knowledge about development periods of children. Kirschhner and Selinger (2003) state that qualified teachers should be raised in order to benefit from technology effectively in education systems. Uçar (1999) confirms that majority of teachers are not equipped with sufficient knowledge and skills in educational technologies during their pre-service training and experience problems in the teaching process. With the implementation of FATİH project (Increasing Opportunities and Improvement of Technology Movement) and increase of technological equipments at the schools, it is now required to have the ability to use these technologies effectively. These necessary skills can be developed by means of in-service trainings at times.

The teachers whose opinions were received stated that they get necessary support from IT teachers when they ask them for support about their own branches. Also, they expressed that problems that are experienced about general computer use and technical issues at the school should be solved by the IT teacher. The opinions revealed that IT teachers are needed in software and technological materials that can be used for educational purposes, raising awareness in IT and innovations and elimination of potential technical problems. The teachers also noted that IT teachers should not be held responsible in technical issues and their reason for such opinion was that IT teachers should contribute in educational aspects and integration of technology into educational settings only.

They also suggested that problems that are experienced about computer and information technologies at the schools can be solved by continuous adaptation of teachers and other personnel to computer technologies and their use and having a computer technician at each school. Akkoyunlu (2002) underlines that educators should integrate technology into their own field of education. Moreover, opinions about duties and responsibilities of IT teachers reveal that IT teachers try to offer all kinds of support in terms of technology but the duty of these teachers should be ensuring that students can use IT in an effective way and keep up with the new developments. It is understood from the opinions of teachers that it is expected that all classes will be equipped with technology at the schools and current technologies will offer the highest features in 5 years. It is believed that IT teachers will offer an effective guidance about computer and educational technologies, the number of IT courses will be increased and this course will be included within the scope of TEOG (Transition from Primary to Secondary Education) in this process. It is also believed that this study will contribute to the effectiveness of IT course. Furthermore, it is expected to contribute to researches in this field, IT teachers and other branch teachers in terms of making use of technology at the school at an optimum level.
The following recommendations can be made based on the above-mentioned conclusions:

- IT teachers could be provided with regular in-service training seminars about their branches and technological developments.
- A legal regulation could be made about not keeping IT teachers responsible for technical issues.
- Administrators, teachers and students could be provided with seminars about educational technologies, technological developments and correct and effective use of technology by IT teachers.
- Having a computer technician at each school could be a solution for IT problems experienced at the schools.
- The number of IT courses can be increased.
- The IT course could be included within the scope of TEOG.

**WJEIS’s Note:** This study is presented as an oral presentation at 3rd International Instructional Technologies and Teacher Education Symposium, Trabzon, 9-11 September.

**REFERENCES**


THE ADVANTAGES AND DISADVANTAGES OF BLOCK SCHEDULING AS PERCEIVED BY MIDDLE SCHOOL STUDENTS

PhDc. Suat Kaya  
Middle East Technical University  
Department of Educational Sciences  
Ankara- TURKEY  
kayasuat2002@gmail.com

Prof. Dr. Meral Aksu  
Middle East Technical University  
Department of Educational Sciences  
Ankara- TURKEY  
aksume@metu.edu.tr

Abstract
Recently, the Turkish educational system has gone through a transition from the 8+4 educational model to the new 4+4+4 system, which has mandated elective courses to be taken by the students increasing number of class hours taken in a week from 30 to 37 hours. This has caused some problems in scheduling of schools in Turkey where double shift schooling is utilized in many schools due to some reasons. The purpose of this research was to examine perceptions of students regarding advantages of block scheduling. 240 students were selected through simple random sampling. The findings revealed that the block-scheduling had many advantages in terms of improvements in student-teacher relationship and teacher methodology, and some disadvantages in terms of attention span, concentration difficulty and basic needs. The perceptions of both the 5th grade students and the 8th grade students were similar regarding the advantages and disadvantages of the block scheduling.

Keywords: Block Scheduling, Student Perceptions, Middle School.

INTRODUCTION
Formal education, which refers to the planned, systematic and intentional behavior changing process, is provided to the individuals through schools. And all schools have a curriculum which can be simply defined as the planned set of activities. The curriculum, hence, bear in itself the idea of complying with the plan in order to arrive at the intended behavior changes.

When Turkish education system is examined, it is seen that, the Turkish curriculum has been prone to various changes in order to keep up with changes occurring throughout the world in all aspects since 2006. With the recent changes, the Turkish education system has gone through a transition from the 8+4 educational model to the new 4+4+4 system. The first four refer to primary education; the second four refer to middle school education and the third four refer to high school education period.

The new program has been in practice since 2013-2014 academic year and one of the majors changes brought with recent developments is addition of elective courses to the curriculum, which mandated that the students take 36-37 hours of lesson in a week instead of 30 hours of lesson in the past. This has caused some problems in the scheduling of schools in Turkey where double shift schooling is utilized due to various reasons such as inadequacy of schools and large size of student population. A lesson lasts for 40 minutes and a break lasts for 10-20 minutes as mandated by Ministry of National Education (MoNe) (2014), and this duration has been determined by taking students’ attention span (Erden, 2001). As a result of inclusion of electives; however, students have had to receive formal education for around six hours a day in the morning, and six hours in the
afternoon by the second shift, therefore this has caused some problems like starting school early in the morning and finishing late in the evening. To solve this problem some schools have had to use block scheduling system which involves extending class periods beyond the traditional 40 to 50 minutes per class session (Huelskamp, 2014). As stated by Cawelti (1994), block schedule refers to a teaching schedule that organizes at least a portion of the school day into larger blocks of time (e.g. more than 60 minutes) to allow greater flexibility for various instructional activities (as cited in Williams, 2011). Theoretically, block scheduling impacts the quality/focus of instruction and improves student achievement. This longer uninterrupted instructional time provides for fewer classes and transitions per day (Calvery, Sheets & Bell, 1998). On the other hand, it is also a challenge for teachers and students to adapt to a new schedule when they have been comfortable teaching and learning the traditional way (Dorwin, 2009). Hence, it bears both advantages and disadvantages as presented in the following paragraphs.

**Literature Review**

The findings arrived at through the literature review of research conducted abroad revealed that block scheduling was mainly used in high schools and universities, whereas use of block scheduling in middle schools was rare. This review also revealed that this system had both advantages and disadvantages in terms of achievement, discipline, attendance, and student-teacher relationships as presented in the following paragraphs.

Cheryl and O’Connell (1997) examined rural high school students’ perceptions of block scheduling. The questions examined stress from both types of scheduling, changes in teachers’ instructional methods, changes in student-teacher relationships, changes in homework, changes in classroom atmosphere, and changes in their attendance and perceptions of the school in general. During the third year of a block scheduling program, juniors and seniors, who had experienced both traditional and block schedules, completed surveys that asked for their perceptions of scheduling and its effects on them before and after block scheduling. Students also gave their opinions about the benefits and problems of block scheduling. Results indicated that students saw little difference in amounts of homework. They considered the longer classes boring because there were no breaks. They saw a slight increase in class discussions and group projects in block scheduled classes. Students considered teachers responsive to their academic needs both before and after block scheduling. They reported traditionally scheduled classes were more chaotic than block scheduled classes. Block scheduling influenced students’ decisions to attend school because it increased the amount of material covered each day. Students felt more stress in school after implementation of block scheduling. Overall, students supported block scheduling.

Calvery, Sheets, and Bell (1998) aimed to compare student perceptions of the block schedule with those of the traditional seven periods in high school. The study described a public school that voted to implement a modified three-block schedule containing two traditional periods. The participants in the study were 200 high-school students, all of whom were switched from a traditional 7-period format to a block schedule. Data collected from surveys were used to compare students’ perceptions on various areas related to block-scheduling practices. The surveys consisted of 12 Likert-scaled questions focusing on attitudes and perceptions. The results indicated that the students did not significantly favor the use of block scheduling. It was also recommended that school administrators should carefully study implementation and evaluation policies when initiating block scheduling.

McCoy (1998) examined the effects of block scheduling in one rural public secondary school with a case study utilizing interviews with students, teachers, and administrative /counseling personnel. Results revealed that block scheduling helped students feel more empowered about learning, and teachers reported more empowerment in their instructional role. More assigned homework was being completed, and teachers indicated satisfaction about the demands on their time. Findings indicate that block scheduling basically benefited all students equally, regardless of ability level, attitude toward school, and degree of school success.

Stader and DeSpain (1999) compared block scheduling to traditional schedules in small high schools (schools with fewer than 500 students in grades 9 to 12) through school administrator and teacher perceptions’ of the effects of block scheduling on student achievement, school climate, and teacher methodology. The results
indicate that teachers and administrators generally believe block scheduling has improved student achievement. Educators perceived an improvement in the quality of student work, depth of subject matter covered, student retention of material, and an increase in enrollment in advanced courses. However, when teachers were divided by subject area, math/science teachers did not necessarily agree with this general assessment. Overall, it was found that block scheduling improved the teacher-student relationship, stimulated changes in teacher methodology, and improved school climate.

Peterson, Schmidt, Flottmeyer and Weincke (2000) analyzed the implementation of block scheduling in a suburban middle school in Minnesota, and its perceived effectiveness as a catalyst for change. The paper presents several advantages of the block schedule suggesting that this type of scheduling system promotes academic achievement, increases creative approaches to instruction, and improves school climate. And teachers wanted to have an 89 minutes-long lessons for an in-depth analysis of a subject.

Trenta and Newman (2002) conducted a longitudinal study to examine a controversial block-scheduling program in a small, mid-western city. Findings were based on “hard” data only, for example, grade point averages and attendance. Data were collected on 500 students with from 0 to 3 years in the program. The findings were supportive of the block-scheduling program.

In another study, Corley (2003) explored student perceptions of, and attitudes about block scheduling after the fourth year of implementation. The sample included 255 students. According to results, students “agreed” (4 on the scale) on 8 of the first11 items as being benefits of block scheduling: more total learning time, more time to learn concepts better, more opportunities to work with other students, more individual help from teachers, the ability to finish homework in class more often, better grades, more time to prepare for tests, and liking for the schedule.

Todd (2007) examined the perceptions of selected Atlanta public middle and high school teachers’ perceptions regarding block scheduling; and to examine whether achievement data for selected Atlanta public middle and high schools differed when comparing those schools during the time frame that block scheduling was in place and after block scheduling was discontinued. The findings revealed that middle and high school teachers favored the block schedule over the traditional schedule. Nevertheless, only middle school achievement improved significantly under a traditional schedule.

Williams (2011) aimed to determine the impact block scheduling had on (a) student academic achievement, discipline, and attendance, and (b) administrator, teacher, and student perceptions. The study compared 2005–2010 data from a high school utilizing the A/B block schedule (90 minutes-long class time) and a high school under a traditional schedule, in one suburban school district. The study, which used mixed methods design, yielded the following conclusions: (1) students experienced higher reading scores on the A/B block schedule than the traditional schedule; (2) students experienced higher math scores under the traditional schedule than the A/B block schedule; (3) attendance rates decreased for students under the A/B block schedule and increased for students under the traditional schedule; and (4) discipline referrals decreased at a higher rate for students under the traditional schedule than students under the A/B block schedule. The administrator, teacher, and student perceptions contributed to the following qualitative findings for the study: (1) block scheduling fosters extended learning sessions when properly planned; (2) with fewer transitions discipline issues decreased; (3) attendance schedule was thought to be difficult at first, but attainable, and would alleviate any feelings of being rushed.

Mamon (2012) aimed to examine the perceptions of public secondary school teachers regarding block scheduling and to identify the perceived advantages and disadvantages of using the block schedule in three secondary schools in one suburban school system in Georgia. Perceptions of teachers were collected through a 23-item survey and three focus group discussions. The study concluded that secondary teachers’ perceptions of block scheduling were generally favorable.

As stated by McCoy (1998), time problems in schools have caused educators to look at alternatives to the traditional scheduling and the use of time has been a focus for change in the educational system on education.
When the research on block scheduling was examined, time was found to be the major reason behind adoption of block scheduling in Turkey.

To illustrate, Yalar and Yelken (2009) investigated the perceptions of teachers and students in terms of block scheduling in a high school in Turkey. 109 students participated and their opinions were collected through a questionnaire while data on the opinions of 5 teachers were gathered through interviews. The results revealed that students’ overall attitude towards and perceptions of the scheduling were negative, students liked the traditional scheduling better; the only advantage reported by students was more free time after school. The teachers suggested that the duration of the break which was short affected students’ learning negatively.

Purpose of the Study
Block scheduling plays an active role in changing curriculum and instructional approaches as teachers adapt to maintain student interest and attention over longer periods of time. Improvements include the integration of various teaching methods, instructional flexibility, and creativity (Calvery, Sheets, & Bell, 1998). Judging by these advantageous influences, it is necessary to find out whether the block scheduling is indeed beneficial in terms of students’ perceptions. The purpose of this study; therefore, was to examine the advantages and disadvantages of block scheduling as perceived by the students in this particular middle school, which could guide instructional improvements in this school.

Related Research Questions
1. What are students’ perceptions of block scheduling in terms of its advantages and disadvantages?
2. Is there a significant difference in the perceptions of the students regarding advantages and disadvantages of block scheduling with respect to grade?

Significance of the Study
Due to the new education system, a great number of schools have gone through transitioning from the traditional schedule to a block schedule due to the reasons mentioned above, and the literature review available to the researcher revealed that there is not much research on this issue in Turkey. The school, in which the researcher works as a teacher, adopted block scheduling, so the students started to have 80 minutes-long classes rather than traditional 40 minutes-long classes. Therefore, there was a need to examine this issue in order to see whether it is favorable according to the perceptions of students, which would help the decision makers in their decision making whether to improve the system with instructional improvements or return to the traditional scheduling. What is more, depending on literature review available to the researcher, there was no research conducted on block scheduling in middle schools in Turkey, the findings of this could help the other schools in similar contexts in deciding whether to adopt block scheduling or not.

METHOD

Research Design
This study utilized survey, a descriptive research, which, according to Best (1970), is concerned with “effects that are being felt” (cited in Cohen, Manion & Morrison, 2007, p. 205). The major reason behind this design is to examine advantages and disadvantages of block scheduling as perceived by middle school students.

Population and Sample
In the school which was using block scheduling, there were 12 classes of 5th graders and 12 classes of 8th graders in the morning shift. There were about 650 8th grade students and 700 5th grade students. 20% of students from each class constituted the sample for this study in order to answer the questionnaire, so 10 students from each class were selected. 120 students from 5th grade and 120 students from 8th grade were selected through simple random sampling in order to ensure the representativeness of the sample as it allows for each and every member of this population to have an equal and independent chance of being selected (Fraenkel, Wallen, & Hyun, 2012).
Data Collection Instruments
The data collection instrument was developed by the researcher himself after a broad review of the literature. The researcher made a comprehensive examination about the questioned points through the analysis of the related articles, books, journals and theses conducted both abroad and in Turkey. In addition, three focus group interviews with 21 students were conducted so as to obtain in-depth opinions regarding the topics of concern. In other words, the main reason behind conducting focus group interviews was to determine the items of the questionnaire. During the focus group interviews, the researcher aimed to elicit the students' general perceptions of the block scheduling. At last, in accordance with the relevant literature and the focus group interview findings, the researcher designed a self-reported questionnaire. Hence, the data on students’ perceptions of block scheduling was gathered through a 20-item questionnaire which was scored using a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores could range from 20 to 100 points. Lower scores indicated disadvantages of block scheduling, while higher scores indicated advantages of block scheduling.

For the scale, an exploratory factor analysis (EFA) was conducted to determine factors of the scale, because it was not known whether there was any relationship among items of the questionnaire (Tabachnick & Fidell, 2013). Before conducting EFA, sample adequacy was checked and it was found to be enough with a sample size of 100 as Hair, Black, Babin and Anderson (2014) advised that sample size should be at least five times of item numbers. Kaiser Mayer Olkin (KMO) index value for the data set for this study was found to be .87 indicating that there is relationship between items. Tabachnick and Fidell (2013) advised .60 and higher KMO values for good factor analysis as “value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors” (Field, 2013, p. 965). Bartlett’s Test of Sphericity was found to be significant with p < .05, indicating that “the correlation matrix had significant correlations among at least some of the variables” (Hair et al., 2014, p.102). Multivariate normality was checked with Mardia’s test and the results showed that multivariate normality was violated (p < .05). Thus, Principal Axis Factoring was used as an extraction method (Costello & Osborne, 2005). In order to clarify and simplify the factor loadings, oblique rotation was implemented (Osborne, 2015). Hence, EFA was conducted, and it initially yielded two factors when the eigenvalues above 1 and scree plot were checked. All the items which were loaded on the factors were >.30, which can be considered as an acceptable correlation (Field, 2009). Fabrigar, MacCallum, Wegener and Strahan (1999) recommend that including at least four variables for each factor is sufficient. According to the results, loadings of variables of each factor were above .30 and at least four variables were loaded into each factor, so two-factor model was interpreted as sufficiently representative of loadings of items into factors. Factor correlations also showed that there was no relationship between factors, because the correlation between factors was below .32 (Tabachnick & Fidell, 2013). The first factor was named as advantages of block scheduling in terms of the improvements in teacher-student relationship and teacher methodology and the second factor was named as disadvantages of block scheduling in terms of problems encountered. The first 14 items were loaded on factor 1 and the last 6 items were loaded on factor 2.

Internal consistency of the factors was calculated with Cronbach’s alpha and the calculated values were .88 for both factor 1 and for factor 2, which shows sufficient reliability according to Nunnally (1978) who recommends that instruments in social sciences should have a Cronbach’s alpha of .70 or higher for sufficient reliability. The results also indicated that there was no need to drop any item from either factor, because reliability did not increase if any item was deleted.

Data Analysis
The data collected through questionnaire was analyzed with Statistical Package for Social Sciences (SPSS) version 22.0. The statistical significance testing was conducted at the alpha level of .05. Descriptive statistics were analyzed through, frequencies, mean and standard deviation. One-way MANOVA was conducted to compare the differences in students’ perceptions of block scheduling in terms of its advantages and disadvantages with respect to their grade level.
FINDINGS

The purpose of this study was to explore perceptions of students about the advantages and disadvantages of block scheduling in a public school in Ankara. 240 questionnaires were delivered and 240 were returned, so response rate was 100%. This response rate was obtained, because the researcher waited for the participants to complete the questionnaires.

The demographic characteristics of the participants are presented in Table 1. Of the participants, there were more females (133) than males (105); the number of participants was equal regarding grade level (n= 120).

Table 1: Demographic Characteristics of the Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>105</td>
<td>44</td>
</tr>
<tr>
<td>Female</td>
<td>133</td>
<td>56</td>
</tr>
<tr>
<td>5th grade</td>
<td>120</td>
<td>50</td>
</tr>
<tr>
<td>8th grade</td>
<td>120</td>
<td>50</td>
</tr>
</tbody>
</table>

Findings for the First Research Question

The first research question asked, “What are students’ perceptions of block scheduling in terms of its advantages and disadvantages? In order to answer this question, means and standard deviations were calculated for the 20 items of the Block Scheduling Scale. Participants were asked to share whether they strongly agreed (SA), agreed (A), were undecided (UN), disagreed (DA), or strongly disagreed (SDA) with each item. Table 2 and Table 3 provide each item along with the means and standard deviations.

Table 2: Descriptive Analysis of Block Scheduling Scale in Terms of Advantages

<table>
<thead>
<tr>
<th>Items</th>
<th>SA</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
<th>SDA</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I learn more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.65</td>
<td>.95</td>
</tr>
<tr>
<td>2. The teachers initiate more discussions among students</td>
<td>67</td>
<td>29</td>
<td>81</td>
<td>34</td>
<td>77</td>
<td>3.83</td>
<td>.92</td>
</tr>
<tr>
<td>3. I receive more individual attention from my teachers</td>
<td>55</td>
<td>23</td>
<td>79</td>
<td>33</td>
<td>88</td>
<td>3.71</td>
<td>.90</td>
</tr>
<tr>
<td>4. I participate in learning activities more actively</td>
<td>76</td>
<td>32</td>
<td>66</td>
<td>28</td>
<td>53</td>
<td>3.67</td>
<td>1.20</td>
</tr>
<tr>
<td>5. I have more opportunities to work with other students</td>
<td>52</td>
<td>22</td>
<td>55</td>
<td>23</td>
<td>71</td>
<td>3.33</td>
<td>1.21</td>
</tr>
<tr>
<td>6. I get answers to my questions more</td>
<td>80</td>
<td>33</td>
<td>56</td>
<td>24</td>
<td>34</td>
<td>3.52</td>
<td>1.37</td>
</tr>
<tr>
<td>7. I can ask more questions</td>
<td>105</td>
<td>44</td>
<td>67</td>
<td>28</td>
<td>37</td>
<td>3.84</td>
<td>1.20</td>
</tr>
<tr>
<td>8. I learn subjects in more detail</td>
<td>52</td>
<td>22</td>
<td>59</td>
<td>25</td>
<td>75</td>
<td>3.98</td>
<td>1.16</td>
</tr>
<tr>
<td>9. I have stronger rapport with my teachers</td>
<td>58</td>
<td>24</td>
<td>70</td>
<td>30</td>
<td>47</td>
<td>3.40</td>
<td>1.16</td>
</tr>
<tr>
<td>10. I have more opportunities to work in pairs</td>
<td>64</td>
<td>27</td>
<td>103</td>
<td>43</td>
<td>55</td>
<td>3.38</td>
<td>1.38</td>
</tr>
</tbody>
</table>
As seen in Table 2, the highest mean was for item 8, which states that “I learn subjects in more detail” (M=3.98, SD=1.16). In other words, the most advantageous impact of block scheduling was learning subjects in more detail.

On the other hand, the lowest mean was for item 20 (Table 3), which states that “I get bored towards the end of courses” (M=1.66, SD=.67). In other words, the students reported that the most disadvantageous impact of block scheduling is boredom felt towards the end of courses.

According to the results as seen in Table 2, for item 1, more than half of the students (54%) reported more learning. For item 2, more than three-fifth of the students (63%) reported more discussion. For item 3, more than half of the students (56%) reported more individual attention from teachers. For item 4, three-fifth of the students (60%) reported more active participation. For item 5, about half of the students (45%) reported more group works. For item 6, about three-fifth of the students (57%) reported they could get answers to their questions more. For item 7, about four-fifth of the students (72%) reported they had the opportunity to ask more questions. For item 8, about half of the students (46%) reported more detailed learning of subjects. For item 9, more than half of the students (54%) reported stronger rapport with teachers. For item 10, about four-fifth of the students (70%) reported more opportunities to work in pairs. For item 11, about half of the students (48%) reported doing more activities. For item 12, about half of the students (47%) reported more chance to clarify a question mark about a particular subject. For item 13, more than half of the students (53%) reported provision of more examples for the new subjects by teachers. For item 14, more than three-fifth of the students (63%) reported more individual help from teachers.
Regarding disadvantages as seen in Table 3, for item 15, more than three-fifth of the students (69%) reported they could not satisfy their basic needs. For item 16, about four-fifth of the students (77%) reported that they lost their concentration in the last courses of the day. For item 17, about four-fifth of the students (79%) reported that they lost their concentration towards the end of courses. For item 18, four-fifth of the students (80%) reported they could not spend sufficient time with their friends. For item 19, four-fifth of the students (79%) reported they were less attentive in their classes. For item 20, more than four-fifth of the students (88%) reported that they got bored towards the end of courses.

Findings for the Second Research Question

The second research question asked, “Is there a significant difference in the perceptions of the students regarding advantages and disadvantages of block scheduling with respect to grade? In order to see if students’ perceptions varied with respect to grade level, One-way MANOVA analysis was employed. An alpha level of .05 was used in determining statistical significance. The assumption of homogeneity of variance was violated, so Pillai’s Trace test, of which robustness to violations of assumptions was the most as stated by Bray and Maxwell (1985), was used (cited in Field, 2009, p. 594). It was also recommended by Olson (1979) to use Pillai’s Trace rather than Wilks’s Lambda to evaluate multivariate significance when the assumptions could not be met (as cited in Tabachnick & Fidell, 2013).

<table>
<thead>
<tr>
<th>Perceptions</th>
<th>5th Grades</th>
<th>8th Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Advantages</td>
<td>51.92</td>
<td>7.98</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>11.39</td>
<td>4.16</td>
</tr>
</tbody>
</table>

A One-way MANOVA was conducted in order to determine the impact of grade level on the perceptions of students regarding advantages and disadvantages of block scheduling. Descriptive statistics are displayed in Table 3, which indicated that with a mean of 51.92, 5th grade students’ perceptions of advantages of block scheduling (SD= 7.98) was higher than 8th graders (M= 49.65, SD= 10.89). Likewise, with a mean of 11.39, 5th grade students’ perceptions of disadvantages of block scheduling (M= 11.39, SD= 4.16) was higher than 8th graders (M= 10.85, SD= 2.74).

As Levene’s Test for Equality of Variances was statistically significant for both subscales (p = .05), thus violating homogeneity of variance, alpha level was adjusted to .04. As shown in Table 4, the MANOVA results indicated that grade level had no significant impact on the students’ perceptions of block scheduling in terms of its advantages and disadvantages [Pillai’s trace = 0.21, F(2, 237)= 2.50, p=.04, η² = .02].

Table 4: The Results of MANOVA for the Effect of Grade Level of Students’ Perceptions of Block Scheduling

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>P</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade level Pillai’s Trace</td>
<td>0.21</td>
<td>2.50</td>
<td>2</td>
<td>237</td>
<td>.08</td>
<td>.02</td>
</tr>
</tbody>
</table>

p<.04

DISCUSSION

The purpose of this paper was to find out perceptions of middle school students regarding the block scheduling implemented at the school where the researcher worked as a teacher. The results showed that the block scheduling had many advantages in terms of students’ overall learning, improvement in teacher methodology due to the uninterrupted instructional time. This finding is consistent with the results of Cheryl and O’Connell (1997), McCoy (1998), Stader and DeSpain (1999), Peterson, Schmidt et al. (2000), Trenta and Newman (2002), Corley (2003), Todd (2007), Williams (2011), and Mamon (2012). On the other hand, this finding is inconsistent with the results of Calvery, Sheets, and Bell (1998), and Yalar and Yelken (2009). This study also found out that there was no difference between perceptions of the 5th grade and the 8th grade students.
However, there are a number of issues that we have to take into consideration while interpreting and generalizing the results of this study. First of all, the sample of this study composed of the students in the morning shift, the students in the afternoon shift did not take part in this study. In addition, the other stakeholders of education including teachers, administers and parents were not included in this study.

Implications for Practice
Based on these findings, block scheduling had positive effects on teacher-student relationship and teacher methodology, however it had some problems as well, so the following suggestion can be put forward in order to solve the problems encountered:

- The duration of the breaks can be increased so that the students can satisfy their needs.
- The teachers should utilize student-centered instructional methods which can keep students’ attention lively so that they won’t get bored and/or lose their attention.
- While arranging the weekly schedule, it must be paid attention to the fact that the last courses of the day be among the ones such as music, physical education, arts which do not necessitate much attention.
- A new curriculum adaptable to block scheduling can be developed so that nothing will be left to occur by chance.

Implications for Further Research
A large scale study can be conducted that includes all middle schools using block scheduling in Turkey; a more comprehensive study can be conducted that includes students, teachers, administrators, and parents. In addition, the schools which have had to adopt block scheduling should be examined carefully and regularly utilizing a longitudinal research design to find out the long term impact of block scheduling such as student and school discipline, student attendance, student achievement and overall school climate. This is crucial, because the decision makers in Turkey should start to think about the use of block scheduling at least in the areas where block scheduling is inevitable. In this way, a new curriculum adaptable to block scheduling can be developed so that nothing will be left to occur by chance.

REFERENCES


THE POTENTIAL BENEFITS OF PODCASTS FOR LANGUAGE LEARNING

Assist. Prof. Dr. İsmail Yaman
Ondokuz Mayis University
Samsun-TURKEY
ismail.yaman@omu.edu.tr

Abstract
In this descriptive study we aim to discuss the potential benefits of using podcasts for language learning purposes in Turkish EFL (English as a foreign language) context. One of their key features is that they remove time and place restrictions in front of language learning enabling learners 24/7 access to audio and video files. Learners also hold the luxury to pause and resume in order to be able to listen to or watch the content for better comprehension. Websites offering professional podcasts update their databases at regular intervals and learners can get access to these new items easily with(out) (un)paid subscription. Furthermore, learners have the opportunity to broadcast and share their self-created podcasts via internet. Briefly podcasting can be employed as an effective tool to raise learner autonomy in language learning. On the other hand, there are some concerns as to the use of podcasts as a tool in English language teaching. The proper selection of the podcasts to download, for instance, is an important stage and cannot be done by every language learner. Besides, the broadcasting of self-created podcasts raises a privacy concern. All of these points that may tend to pose problems for language learners should be handled carefully in order to be able to go through a smooth learning process.

Keywords: Podcast, language learning and teaching, internet, technology.

INTRODUCTION

Today we are living in an era of information and technology. Technology brings us new utilities each passing second. These rapid developments also have their reflections in the educational realm. The advent of useful tools such as smartboards, laptops, smartphones, tablets, iPods, and wireless technologies has contributed much to the teaching and learning processes in almost all fields. The field of English language teaching and learning is one of these. Especially following the introduction of Web 2.0 tools and applications both teaching and learning English have become far more colourful and easier. The potential contributions offered by the use of podcasts constitute a quite significant dimension within this context. As a portmanteau word yielded by the combination of ‘iPod’ and ‘broadcast’, a podcast refers to audio or video files that can be accessed via internet. As its name implies podcasts originally referred to files downloaded to iPods, however it has gained a broader scope over time encompassing other digital access tools than iPods. In its current sense, podcasts generally cover audio or video files created or adapted to specifically serve a didactic purpose. Considering those serving to contribute to the development of English language skills of learners, they can be accessed or downloaded via some official websites like that of BBC or other less official websites such as www.eslpod.com.

As a result of the fast developments in technology and education, the expectations of learners are constantly changing. Therefore both teachers and learners are to keep pace with such rapid developments and assume new responsibilities. In the context of this new technology-education paradigm of the 21st century, Bonk (2009: 51) suggests ten openers (WE-ALL-LEARN) likely to foster learning.

• Web Searching in the World of e-Books
• E-Learning and Blended Learning
• Availability of Open Source and Free Software
• Leveraged Resources and OpenCourseWare

COPYRIGHT © JOURNAL OF EDUCATIONAL AND INSTRUCTIONAL STUDIES IN THE WORLD
Learning Object Repositories and Portals
Learner Participation in Open Information Communities
Electronic Collaboration
Alternate Reality Learning
Real-Time Mobility and Portability
Networks of Personalized Learning

It is clear from the above list that technology and its fruits are becoming an indispensable part of learning processes in the new century. However, it is not so easy to put these into practice. The new and the old generation today are digitally divided. The terms digital native and digital immigrant were introduced by Prensky (2001) to designate this divide. Below is a list of the differences between digital immigrants and digital natives adapted from the list by Zur and Walker (2011) based on Rosen’s (2010) and Prensky’s (2001) studies.

Table 1: Differences between digital immigrants and digital natives

<table>
<thead>
<tr>
<th>Digital Immigrants</th>
<th>Digital Natives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefer to talk on phone or in person</td>
<td>Prefer to connect via text, chat, Facebook, online games, etc.</td>
</tr>
<tr>
<td>Do not use text or use it sparingly and reluctantly</td>
<td>Text more than call: Almost half of all teens can text with their eyes closed</td>
</tr>
<tr>
<td>Prefer synchronistic communication, in real time, such as f2f or phone conversations</td>
<td>Prefer a-synchronous or sequential communication, such as in email, Facebook, or chat</td>
</tr>
<tr>
<td>Accustomed to and prefer instructional manuals with clear sequential steps. As “reflective learners” they like a logical and linear process of discovery</td>
<td>Cannot relate to manuals - Solve problems “intuitively.” As “intuitive learners” they are engaged in rapid ’trial and error’ actions and prefer discovering via actions, experimentation and interaction rather than by reflection</td>
</tr>
<tr>
<td>Prefer receiving information slowly: Linearly, logically, and sequentially</td>
<td>Prefer receiving information quickly and simultaneously from multiple multimedia and other sources</td>
</tr>
<tr>
<td>Prefer singular processing and single or limited tasking</td>
<td>Prefer parallel processing, multitasking or task switching</td>
</tr>
<tr>
<td>Prefer reading text (i.e., books) on processing pictures, sounds and video</td>
<td>Prefer processing and interacting with pictures, graphics, sounds and video before text</td>
</tr>
<tr>
<td>Inclined to read a book from cover to cover</td>
<td>Inclined to read texts in short bursts, one paragraph at a time, hopping to other activities, such as texting or Facebooking, in between paragraphs</td>
</tr>
<tr>
<td>See high value in deferred gratification and rewards</td>
<td>Prefer instant gratification and rewards, do not see value in waiting</td>
</tr>
<tr>
<td>Hierarchical approach to workplace rather than a democratic or egalitarian one</td>
<td>View the workplace more in egalitarian terms and less in hierarchical (top-down) terms</td>
</tr>
<tr>
<td>Rely on a traditional 5-day work week, followed by an off-work weekend</td>
<td>Work intermittently 7 days a week; alternate among play, work, socializing, etc. 24/7. No &quot;end&quot; to the week - continuous flow, natural rhythm</td>
</tr>
<tr>
<td>Hang out in person, clubs, dinners, etc.</td>
<td>Hang out both online (Facebook, texting) and also offline (concerts, parties)</td>
</tr>
<tr>
<td>Value ‘proper’ English</td>
<td>Use texting and instant message shorthand: cu tomorrow; luv ya, r u going to the game?</td>
</tr>
<tr>
<td>Tell friends about a trip on the phone, or with an in-person conversation or at-home slideshow</td>
<td>Tell friends about a trip by posting pictures on Facebook (visual versus verbal or text stories)</td>
</tr>
<tr>
<td>Use the Internet to gather information</td>
<td>Use the Internet to socialize, play, have</td>
</tr>
</tbody>
</table>
Think of the Internet in passive terms of what they can read, review or learn

Think young people waste their lives online
Think of the Internet and virtual world as not part of "real life"
One task or pleasure at a time

Value privacy and limit self-disclosure to small circle of friends, if even that

Prefer more knowledge and "just-in-case" approach
Learning is a necessity and is often unavoidable drudgery

Get their news via traditional news sites (New York Times, local papers) or hard copy newspapers

Prefer to have 'quality' interaction with one or few people rather than many

fun, watch videos, shows, create, etc.
View the Internet in terms of interaction and participation rather than as passive or one-directional
Many aspects of life are happening only online
Internet is as real, and often more pleasurable and tangible, than offline life
Like multitasking and task switching. Prefer several tasks or recreation activities at a time: Watch a show, socialize, text, study, play, etc.
Put highly personal information on social networking sites, where they may have hundreds or even thousands of friends who can view. Also put personal videos on YouTube - not afraid to be known, not especially concerned with privacy
Prefer to learn "just-in-time" and what is minimally necessary
Learning should be fun and knowledge is often acquired via fun activities, such as gaming, surfing the web or social networking.
Get their news from friends via Facebook (political discussions on walls), Twitter, political blogs. Traditional news sites are a part of, but not the central piece, of news for this group
Interact/network simultaneously with many, even hundreds of others, as well as with best few friends

Table 1 makes it clear that digital natives and digital immigrants differ from one another to a remarkable extent. Today we can regard the students born as of 1990s into technology as digital natives and the earlier generations as digital immigrants. As the learner group mostly consists of digital natives their digital expectations should somehow be addressed. The advent of podcasting, within this context, is the subject matter of this paper and is covered in relation to its possible contributions to language learning and teaching processes.

WHAT IS PODCASTING?

The term *podcasting* was first introduced by Ben Hammersley in a newspaper article on 12 February 2004 titled 'Audible revolution' as follows:

With the benefit of hindsight, it all seems quite obvious. MP3 players, like Apple's iPod, in many pockets, audio production software cheap or free, and weblogging an established part of the internet; all the ingredients are there for a new boom in amateur radio. But what to call it? Audioblogging? Podcasting? GuerillaMedia?"

(http://www.theguardian.com/media/2004/feb/12/broadcasting.digitalmedia).

As a fairly recent word, *podcasting* has achieved to be one of the posh terms in the digital world. At the very beginning, podcasts covered only audio files, but later the term began to encompass video files as well. Even though the video files are sometimes called *vodcasts* in order to make a distinction, the term *podcast* has gained a broad coverage. This coverage has reached such borders that every audio or video file on internet including the ones on popular websites like Youtube has begun to be considered as a podcast. This is a real misconception as to podcasts.
Then what makes podcasts different from ordinary audio or video files? Rosell-Aguilar (2007: 472) clarifies this point as follows: “The fact that podcasting uses RSS is what differentiates it from simple downloading or streaming. The use of RSS, or Really Simple Syndication, means that the user can subscribe to a podcast that will be downloaded automatically every time there is an update or new content is uploaded.” In order to be regarded as a podcast, an audio or video file needs to be a part of an automatically-updated system. Another dimension is the subscription system. Users can get access to podcasts through free or paid subscription (depends on the website) and get automatic updates via RSS (Really Simple Syndication) extension. These podcasts can be downloaded and played through software like iTunes and QuickTime. Once downloaded, the podcasts can be played offline, which renders the system independent and easily-accessible on the part of the users.

WHAT DOES PODCASTING PROMISE FOR LANGUAGE LEARNING AND TEACHING?

Podcasting holds uses for both learners and teachers and both parties have two alternatives to utilize this tool: using existing podcasts or creating one’s own original podcasts. This two-alternative model is illustrated by Rosell-Aguilar (2007: 476) as follows:

![Figure 1: Taxonomy of uses of podcasting for language learning (Rosell-Aguilar, 2007: 476).](image)

The easier alternative here for both students and teachers is making use of existing podcasts. There are a number of podcast sites specially designed for language learning. The following is a concise list of the popular ones:

- [www.podcastsingenglish.com](http://www.podcastsingenglish.com)
- [https://learnenglish.britishcouncil.org](https://learnenglish.britishcouncil.org)
- [www.bbc.co.uk/podcasts/genre/learning](http://www.bbc.co.uk/podcasts/genre/learning)
- [www.espod.com](http://www.espod.com)
- learningenglish.voanews.com/Podcast
- [www.listen-to-english.com](http://www.listen-to-english.com)
- [www.betteratenglish.com](http://www.betteratenglish.com)
The existing podcast sites are not limited to the above list. Both students and teachers can easily find and utilize an unlimited number of resources on such sites that are designed to help them in their language-related studies. For students, for example, such digital tools and learning aids can be really motivating as audio-video resources appeal to digital natives far more than written resources. Working both online and offline (once downloaded) on almost any portable digital device, podcasts remove time and place restrictions. Thus students hold the option to extend their studies out of the classroom and improve their language skills on their own, which makes them autonomous learners. As podcasts consist of audio and video files, they constitute an invaluable tool that contributes to the development of listening and pronunciation skills. Especially in foreign language learning contexts it is hard to access authentic materials. Podcasts remove this barrier through original speech, dialogues, radio and TV programmes, etc. They also foster other language skills, reading and vocabulary skills in particular. Podcast sites generally offer the transcripts of the audio-video files with accompanying exercises. Accordingly, language learners can reap an integrated benefit from podcasts on their journey to develop language skills. On the other hand, such websites offer benefits for also language teachers. They can bring to-the-point audio-video files to the classroom or ask students to consolidate a specific aspect through a suggested podcast at home.

The difficult alternative ‘creating one’s own original podcasts’ is a bit more demanding but much more enjoyable. This time the learner takes the lead and produces something. Thus they become much more active through learning by doing. Meng (2005: 2) lists five steps for podcasting/vodcasting:

- Create or capture and edit the content.
- Publish content to a website or blog.
- Subscribe to the content using an “RSS News Reader”.
- Download the content into content management software (CMS).
- Play content on download device or synchronize CMS with portable media player and play

The above list may seem a bit technical to especially digital immigrants, but once achieved it gives a real sense of achievement to those who are involved in the process. Meng (2005: 5) lists the following possible uses of creating podcasts:

- Record and distribute news broadcasts.
- Recorded teacher’s notes.
- Recorded lectures distributed directly to student’s MP3 players.
- Recorded meeting and conference notes.
- Student projects and project support interviews.
- Oral history archiving and on-demand distribution.

Podcasting is harder than making use of the existing podcasts for both learners and teachers, but getting involved in such a process will enhance the sense of learning by doing, raise student-student and student-teacher communication, and broaden the students’ out-of-class experiences. Teachers, through podcasting, can turn their classes into flipped classrooms and focus more on the practical dimension within class hours. At this point, digital immigrant teachers may be disadvantageous as creating podcasts requires a certain level of technical knowledge, however by facing their technology-related weaknesses and getting external help they can handle this disadvantage. The teachers’ role is quite important in the use of podcasts in that they are expected to guide the students about when and how to utilize certain podcasting websites. Podcasts will of limited use for language learners if not supported with rich linguistic content. Digital divide is another problem here. It may not be possible for all students to have access to internet 24/7 and some websites require paid subscription. Such issues may cause a real disadvantage for some students. In such cases, teachers should do their best to assist these disadvantaged students. Podcasts may sometimes be distractive for students as the
cyber world is exempt from restrictions. Lures from other tools like social media accounts may probably distract self-studying learners from the actual task they focus on. Also for some learners, the use of podcasts may cause overdependence on technology over time. Therefore a sheer balance should be established between paper-pencil studies and computer-screen studies. To this end, students should be made aware of the potential benefits of using podcasts for language learning and their studies on the existing podcasts or their own podcast producing experiences should be carefully guided by the language teacher.

CONCLUSION

Podcasting is a relatively new concept in the educational realm. However, “newer is not always better” as Yaden (2007: 1) puts it. What makes a novelty useful and practical is the proper running of the application process. To support this point Yaden states (2007: 2) “as with all technology, the most difficult part is finding the most sound pedagogical use for the resource…” That is, the integration process is of vital importance on the way to reap positive outcomes. Therefore, the use of podcasts for language learning and teaching purposes has definitely several merits; nevertheless, the weak points likely to be involved in the application process should be carefully identified and eliminated as much as possible. In the light of the coverage of this paper, a brief list of pros and cons of podcasting for language learning and teaching is provided below:

**Pros**
- Motivating
- Appeals to digital natives
- Omnipresent-no time and place restriction
- Enhances learner autonomy
- Both online and offline
- Contributes to the development of listening and pronunciation skills
- Also supports other language skills
- Limitless resources
- Authentic (native use of language)
- Involves both teacher and student

**Cons**
- Digital divide
- Digital immigrant teachers
- Will be of limited use if not supported with rich linguistic content
- May sometimes be distractive
- Creating podcasts requires technical knowledge
- Some websites require paid subscription
- May cause overdependence on technology over time

The above-listed pros and cons clearly demonstrate that the positive aspects of using podcasts for language learning and teaching far outweigh its disadvantages. What counts here is the presence of an effective planning process. By its very nature podcasting address more to students. For this reason, language teachers should undertake a guiding role throughout the process of access to right podcast sites and encourage students to create their own podcasts on a regular basis. Thus the receptive benefits of podcasting could be extended to productive outcomes. Last but not least, there is a broad need for experimental studies on this new horizon in the field of language learning and teaching. Studies to be carried out in different contexts such as teachers creating podcasts, students creating podcasts, and students and teachers utilizing podcasts produced and uploaded by others. Each prospective study is expected to shed light upon the applied dimension of podcasts in the realm of education and language learning-teaching.

**WJEIS’s Note:** This study is presented as an oral presentation at 3rd International Instructional Technologies and Teacher Education Symposium, Trabzon, 9-11 September.
REFERENCES


THE EFFECT OF COMPTON SCATTERING TEACHING BASED ON HOT CONCEPTUAL CHANGE ON STUDENTS' CONCEPTUAL CHANGE

Assoc. Prof. Dr. M. Sabri Kocaküləh
Balıkesir University
Necatibey Education Faculty
TURKEY
sabriko@hotmail.com

Dr. Mehmet Kural
Ministry of National Education
TURKEY
mehmet_kural1@hotmail.com

Abstract
The aim of this study is, within the framework of Teaching Model for Hot Conceptual Change, to investigate the effect of cognitive conflict based Compton Scattering teaching that was supported by motivational and metacognitive strategies on students' conceptual change. The sample of the study in which mixed method design was used consists of 40 students from two grade 11 classes at an Anatolian Teacher High School in Turkey. Data were collected with Modern Physics Concept Test (MPCT) and semi-structured interviews. MPCT was administered as pre, post and delayed post tests which were followed by semi-structured interviews with a total of 14 students, including seven students from each class. Data gathered from MPCT were analyzed by using content analysis and tabulated. Also, students' responses to interview questions were coded and personal development tables were created. The research findings show that students' views about Compton Scattering cannot be related with the scientific view before instruction. However, it has been found that the instruction based on TMHCC is considerably successful in helping students to change their conceptions after instruction. Also, students' insistent misconceptions after the instruction were identified and these misconceptions were associated with the stages of instruction to reveal the limitations of instruction in this study.

Keywords: Conceptual change, hot conceptual change, teaching physics, Compton scattering.

INTRODUCTION

According to Conceptual Change Theory (CCT), which was proposed in the early 1980s in order to explain conceptual change, students try to use their existing conceptions when they encounter a new situation. This phase is called "assimilation". However, students' existing conceptions sometimes may not allow them to explain new phenomena successfully. In this condition, students need to change or reorganize their existing conceptions. This phase is called "accommodation" in conceptual change (Posner, Strike, Hewson and Gertzog, 1982).

Many teaching strategies have been proposed for use in conceptual change based teaching. These can be divided into three groups: (1) Discripant Event, (2) Conflict between ideas, (3) Development of ideas. In plethora of studies, it has been proved that aforementioned strategies have a positive effect on learning (Dreyfus, Jungwirth ve Eliovitch, 1990; Scott, Asoko ve Driver, 1992). However, researchers have stated that CCT has a limitation. The one of the criticisms made to CCT is the structure that takes into account only the cognitive elements (Pintrich, Marx and Boyle, 1993; Vosniadou and Ioannides, 1998; Limon, 2001; Duit and Treagust, 2003).
According to researchers, CCT takes into account only cognitive elements but does not consider affective factors such as personal interest, motivation etc. (Pintrich et al., 1993). For this reason CCT was called as cold conceptual change. It has been proposed that the process of conceptual change and components of motivation should be linked (Pintrich et al., 1993). Furthermore, it has been asserted in some research that students may not experience cognitive conflict and they may not experience dissatisfaction with their preconceptions.

Dole and Sinatra (1998) have emphasized the effect of heuristic and systematic information processing on conceptual change and they have also described the effect of motivation on conceptual change in their Cognitive Reconstruction of Knowledge Model (CRKM). In CRKM, the positive effect of high cognitive engagement and systematic information processing on conceptual change was emphasized. Furthermore, authors explained the conceptual change of students who used heuristic information processing with peripheral cues, so they classified conceptual change as weak and strong. In CRKM, authors linked futures of reform message with students' affective characteristics.

Gregoire (2003) proposed Cognitive Affective Model of Conceptual Change (CAMCC) in which automatic evaluation of reform message had been seen as an identifier of what kind of information processing would be used. The CAMCC explained the impact of emotions such as fear and anxiety on conceptual change and Gregoire (2003) asserted that hot trend in conceptual change was started. On the other hand, Yildiz (2008) showed the positive impact of metacognitively oriented class atmosphere on conceptual change and proposed a new conceptual change model.

It has been seen in the literature that conceptual change models has been experiencing an affective revolution and addition of the affective characteristics of students to conceptual change models has become a new trend. Furthermore, it has been noticed that these studies remained in the domain of cognitive-affective psychology and they had a little evidence in science teaching perspective. At this point, the question of “how should we teach?” must be answered again. A few number of teaching models based on warm and hot conceptual change have been found in the literature. Hence, taking into account that teaching models integrating cognitive and affective dimensions are sparse in the literature, Kural (2015) proposed Teaching Model for Hot Conceptual Change (TMHCC). Whether such a model provides conceptual change for students at high levels or not is the problem of this study. The aim of this study is to investigate the effect of teaching based on cognitive conflict and supported by metacognitive and motivational strategies on students' conceptual change related to Compton scattering topic.

**METHOD**

In this study, mixed method was used as a research design due to the nature of problem of the study. Only the success of TMHCC in helping students at the point of changing their conceptions about Compton scattering has been discussed. For this reason, in quantitative part of research, authors avoided from comparing groups, so a single group pre-test post-test design was used.

Furthermore, particular attention was paid to give qualitative descriptions by focusing on what students meant about conceptions which had been examined. These descriptions hierarchically ranked and response categories were created. Therefore, it can be said that phenomenology was used in the qualitative part of study (Marton, 1986; Smith and Eatough, 2007).

**Sample**

Convenience sampling method was used in this research (Patton, 1987). 40 grade 11 students, who were at an Anatolian Teacher High School of a district of Manisa in Turkey in 2012/2013 academic year, were chosen for sample.

**Data Collection**

Modern Physics Concept Test (MPCT) was applied as pre test and post test in order to determine students' conceptions or views before and after the instruction. Five months after the instruction, MPCT was applied
again as a delayed post test for diagnosing strength of students' conceptual change and determining whether conceptual change was permanent or not.

MPCT consists of 11 open-ended questions, which were written by researchers and taken directly from the literature or modified slightly. The validity of the test was provided by concept map based on Grade 11 Teaching Program of Physics Course and approved by panel of two experts in the area of physics education. The question dealing with Compton scattering in MPCT, which was applied as pre test and post test, is shown in Figure 1.

![Figure 1](image1)

Figure 1: The question about Compton scattering in pre and post tests.

In the delayed post test, the question was changed but new question was prepared in the same context with the pre-post test question as shown in Figure 2. The aim of this application is to determine how students transfer their conceptions to new situations.

![Figure 2](image2)

Figure 2: The question about Compton scattering in the delayed post test.
Semi-structured interviews were used for in-depth examination of students' conceptual change as another data collection instrument. The audio records were transcribed and coded. Coding reliability was ensured by secondary researcher, who was expert in the area of physics education.

Data Analysis
Content analysis method was used to determine students' concepts and relationships between those concepts. Firstly, experts and researchers agreed on the full responses for questions. Secondly, pre, post and delayed post test data were coded. Inter-coder reliabilities between the researcher and a second coder were calculated to be as 90% for the pre test, 95% for the post test and 95% for the delayed post test responses.

Data gathered from semi-structured interviews were used for data triangulation purposes to support data gathered from MPCT. Furthermore, students' responses in pre, post and delayed post applications of semi-structured interviews were coded in the categories which were created after the content analysis of MPCT. Tables that show personal development of students who joined the interviews were also created.

FINDINGS

Table 1 was composed by analysing students' responses to the question about Compton Scattering in MPCT that was administered pre, post and delayed post teaching.

<table>
<thead>
<tr>
<th>TYPES OF RESPONSES</th>
<th>TEST TYPE</th>
<th>Pretest N (%)</th>
<th>Post Test N (%)</th>
<th>Delayed post Test N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Scientifically Acceptable Responses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Full Argument</td>
<td></td>
<td>0 (0)</td>
<td>16 (40,00)</td>
<td>21 (52,50)</td>
</tr>
<tr>
<td>2. Part of Argument</td>
<td></td>
<td>3 (7,50)</td>
<td>11 (27,50)</td>
<td>8 (20,00)</td>
</tr>
<tr>
<td>Subtotal 1</td>
<td></td>
<td>3 (7,50)</td>
<td>27 (67,50)</td>
<td>29 (72,50)</td>
</tr>
<tr>
<td>B. Scientifically Unacceptable Responses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Responses Based on Modern Physics</td>
<td></td>
<td>4 (10,00)</td>
<td>13 (32,50)</td>
<td>5 (12,50)</td>
</tr>
<tr>
<td>2. Responses Based on Classical Physics</td>
<td></td>
<td>11 (27,50)</td>
<td>0 (0)</td>
<td>1 (2,50)</td>
</tr>
<tr>
<td>3. Intuitive Responses</td>
<td></td>
<td>12 (30,00)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Subtotal 2</td>
<td></td>
<td>27 (67,50)</td>
<td>13 (32,50)</td>
<td>6 (15,00)</td>
</tr>
<tr>
<td>C. Uncodeable Responses</td>
<td></td>
<td>7 (17,50)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>D. No Response</td>
<td></td>
<td>3 (7,50)</td>
<td>0 (0)</td>
<td>5 (12,50)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>40 (100)</td>
<td>40 (100)</td>
<td>40 (100)</td>
</tr>
</tbody>
</table>

Findings Obtained From The Analysis of Pre Test Responses
In the pre test, it was found out that there was no full argument. 7.5% of students' responses were coded as part of argument. Student 21's response (S21), which has been coded in that category, has been exemplified below in Figure 3. Also, a part from interview record that belongs to S21 has been presented below.
"The scattered X-rays collided with electrons. But X-rays, which were not scattered, passed through the cellular structure of the atom"

Figure 3: Response of student 21 to the question about Compton Scattering in the pre test pre test

S21: In this question, I think of an atom that has a cellular structure. The X-rays, which are not scattered, pass through the atom. But scattered X-rays collide with protons. There was a scattering experiment. I try to relate this condition with that experiment.

Researcher: What do you mean about scattering experiment?

S21: There was a scattering experiment. Rutherford did. Alpha particles were passing through a golden plate. Some of them were scattered and some were passing through without changing their direction.

Researcher: How the alpha particles change their directions?

S21: I think they were colliding with protons and were scattered. The particles, which were not scattered, were passing through cellular structure.

Researcher: In the pre test, you wrote "X-rays collide with electrons".

S21: Did I? I should not say so. They must collide with protons.

Researcher: In fact, do you think that X-rays collide with protons and they are scattered?

S21: Yeah.

Researcher: What do you say about increase in the wavelength of X-rays?

S21: X-rays have different kind of charge. So wavelength of them can change when they collide with protons.

Researcher: Why?

S21: Is it because they interact with?

Researcher: What do you mean by increase in wave length?

S21: Is it increase in amplitude of the wave length? Don’t know!

As shown in the dialogue above, student 21 explained the event by relating it with Rutherford’s alpha scattering experiment. Student 21 stated that scattered X-rays collide with protons and unscattered X-rays pass through cellular structure of atoms. When the interviewer asked about contradiction between pre test and preinterview responses, student 21 said that she had given wrong answer in the pre test and insisted on the idea that was based on Rutherford’s experiment. Furthermore, student 21 stated that X-rays consist of charges. Dialogues with student 21 show the fact that student 21 did not demonstrate scientifically accurate conceptual understanding.

In the pre test, it has been revealed that 10% of students gave scientifically unacceptable responses based on modern physics. Some of these responses were given below.
X-rays can change their direction by interacting with atoms or electrons. For this reason, their wavelength can increase. Unscattered X-rays could not encounter with atoms and electrons.

Figure 4: Student 12’ s response in the pre test.

In the pre test, 27.5% of students gave scientifically unacceptable responses based on classical physics concepts. These responses were examplified and a part of dialogue from student 4’s preinterview was also given below.

X-rays do not refract if they do not face with electrons. However, X-rays refract if they encounter with electrons.

The carbon block is treated as a flat mirror. Sent rays create the image behind that carbon block.

Researcher: What do you say about the condition given in second question?

I thought that X-rays were reflected or refracted from carbon block.

Researcher: How do you explain increase in the wavelength?

I can say decrease in frequency...

In the pre test, 30% of students gave intuitive response. It has been noticed that when students realize that their mental models based on classical physics are unsuccessful to explain phenomena, they start to make predictions about it. Such responses were examplified below.

X-rays that are faced with electrons, push each other. X-rays can move faster and their direction may change.

X-rays scatter when they hit the carbon. The reason of increase in wavelength is due to gained energy from carbon during collision.

X-rays can scatter from carbon because of their interaction with atoms.

In the pre test, 7.5% of students left the question unanswered. It has been evident in the pre test that the vast majority of students had scientifically unacceptable views or conceptions.

"The rays hitting the nucleus of an atom change their direction. Because of this collision, rays lose power and its intensity is reduced which is resulted in increase in frequency and thus increase in its wavelength."

In the pre test, 5% of students left the question unanswered. It has been evident in the pre test that the vast majority of students had scientifically unacceptable views or conceptions.
Findings Obtained From The Analysis of Post Test Responses

In the post test, 40% of students responses were coded as full argument and 27.5% of them were coded as part of argument that composed scientifically acceptable responses altogether. It can be said that instruction helped some students change their conceptions. A part of dialogues from post interview records that are shown below belongs to students who gave full argument response in the post MPCT.

Researcher: What do you say about Compton scattering?

S23: Photon was sent to carbon block. Photon hits atom. An electron was scattered. Another photon was also scattered.

Researcher: Anything else you want to add about Compton phenomenon?

S23: Momentums of scattered electron and photon are equal to incident photon’s momentum. Energy is also conserved. I remember that light shows the properties of a particle.

In the pre test and preinterview student 23 gave intuitive responses. In the post test and post interview the same student gave full argument answer. A part of post interview dialogue that belongs to student 4 who gave full argument answer in the post test is represented below.

Researcher: What occurs to you about Compton phenomenon?

S4: I know that momentum and energy are conserved in this event.

Araştırmacı: Can you explain this event further?

D4: X-rays are sent to a carbon block. Some of X-rays change their direction and some of them do not. The wavelength of scattered X-rays are increased. If the detector is rotated clockwise, angle of X-rays increase. If the angle increases, wavelength increases too. This event is an evidence for particle nature of light. The momentum and energy is conserved in this event.

It is clear in the post interview record that instruction helped student 4, who gave scientifically unacceptable responses based on classical physics before teaching, change preconceptions.

After teaching, 32.5% of students responded scientifically unacceptable way based on modern physics. Such responses are presented below.

Figure 5: Student 2's response in the post test.
"If X-rays, which have high energy, pass close to nucleus or get into contact with nucleus, they are scattered and they lose some energy. Most of the X-rays reach detector without scattering due to majority of the space inside an atom is empty. Thus, their energy and wave length remain constant."

**S7:** Some photons strike to nucleus and undergo a change. Some of them move through without changing their directions because of cellular structure of atoms.

**S9:** Carbon block has a cellular structure. Some rays pass through these regions without undergoing a change but some of them strike to nucleus or protons of a substance and lose some amount of energy. Because energy is given, frequency is decreased and wavelength is increased.

**S22:** This is called Compton phenomenon. Some electrons change their wavelength by hitting to nucleus in this phenomenon. Meanwhile, some others pass through the holes.

A part of post interview record that belongs to student 2 is shown below.

**Researcher:** In your response to the conceptual understanding test, you wrote that X-rays are deflected if they pass close to the nucleus. Why do you think so?

**S2:** Rays passing very close or touching to nucleus transfer some energy and diverge. It’s because they contact with the nucleus. As I watched at the simulation, rays passing close were scattered. **Researcher:** Which simulation do you remember?

**S2:** In fact, I remember Rutherford’s experiment. An atom with holes is explained there. Those moving close to the nucleus undergo a deflection in that simulation.

Interview record above shows that students have a firm believe of ”X-rays are scattered when they travel close to the nucleus” and they base this idea on the simulation about Rutherford’s experiment.

**Findings Obtained From The Analysis of Delayed Post Test Responses**

As can be seen in Table 1, 52.5% of the students gave full argument and 20% of them responded part of argument in the delayed post test. Altogether 72.5% of students reasoned scientifically acceptable arguments and this indicated that those students were able to transfer acceptable ideas and experienced a strong conceptual change.

Table 2 shows details about conceptual change of students interviewed. As shown in the Table 2, student 2 gave full argument in delayed post test while he responded part of argument in the delayed post interview. A part of delayed post interview record that belongs to student 2 is shown below.

<table>
<thead>
<tr>
<th>Category</th>
<th>PRE</th>
<th>POST INTERVIEW</th>
<th>DELAYED POST INTERVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>$1, 54, 512, 523, 525, 531$</td>
<td>$1, 54, 512, 523, 525, 531$</td>
<td>$1, 54, 512, 523, 525, 531$</td>
</tr>
<tr>
<td>A2</td>
<td>$12$</td>
<td>$12$</td>
<td>$12$</td>
</tr>
<tr>
<td>A3</td>
<td>$523, 524, 525$</td>
<td>$523, 524, 525$</td>
<td>$523, 524, 525$</td>
</tr>
<tr>
<td>B1</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
</tr>
<tr>
<td>B2</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
</tr>
<tr>
<td>B3</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
</tr>
<tr>
<td>C</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
<td>$523, 524, 525, 531$</td>
</tr>
</tbody>
</table>

**Table 2:** Personal development of students interviewed

<table>
<thead>
<tr>
<th>Positive Change</th>
<th>No Change</th>
<th>Negative Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>$523, 524, 525$</td>
<td>$523, 524, 525$</td>
<td>$523, 524, 525$</td>
</tr>
</tbody>
</table>
S2: X-ray caused electron to be emitted. The electron arrived electron detector. Scattered X-ray came to Detector 2.

Researcher: What can you say about part b?

S2: The decrease in energy causes increase in wavelength. Unscattered X-rays do not pass graphite straight forward and they do not lose energy, so the wavelength remains small.

Researcher: I want to ask something. Can X-rays reflected from the nucleus?

S2: I think, X-rays do not interact with nucleus. I do not remember exactly. They are passing through very close to nucleus but not colliding with it.

Researcher: Can X-rays collided with nucleus be reflected?

S2: I think it is impossible...Actually it can be... Photon is sent, so atom can be excited.

Researcher: Can the nucleus be excited?

S2: I do not know.

Researcher: When I look your post test response, I can see the explanation based on the view that "X-ray collides with nucleus and is scattered.

S2: I am sure about the answer I told you now.

Researcher: Did you relate this question with any of topics learned?

S2: Compton scattering... I think so.

Researcher: What is Compton scattering?

S2: X-rays are sent and the electrons are scattered.

In delayed post interview, student 2 was asked whether his delayed post test response was correct. Student 2 answered that his response in the delayed post test was correct. But when student 2 was asked about reflection of X-rays from a nucleus, he responded that it was possible. As shown in the last part of interview dialogue, Rutherford's experiment has a negative impact on students' conceptual ecology.

The analysis has also shown another interesting situation. Students, who have an idea of "X-rays are reflected from nucleus" before the instruction, change their preconceptions towards scientific conceptions. For example, as shown in Table 2, student 12 gave a full argument in the post and delayed post tests. A part of delayed post interview that belongs to student 12 was given below.

S12: When an X-ray is sent, it interacts with atom. X-ray gives energy to electron and an electron is emitted. Electron detector detects this particle. X-ray, which leaves the graphite, is detected in detector 2.

Researcher: What can you say about part b of question?

S12: All of X-rays do not interact with atoms. If the incoming X-ray interacts with atoms and collides with electron, it loses energy and its wavelength increases. But if another X-ray does not interact, its direction does not change and its wavelength remains the same.
Overall, 72.5% of students gave scientifically acceptable responses in the delayed post test. However, 12.5% of the students continued to respond in modern physics terms in an unacceptable way. All of these responses based on modern physics involve again the notion that “X-rays are scattered when they collide with nucleus or pass close to nucleus”. 12.5% of the students did not answer the question five months after instruction.

**DISCUSSION AND CONCLUSIONS**

Many students (67.5%) reasoned scientifically unacceptable responses to question about Compton scattering in the pre test. Table 3 shows students’ reasonings revealed both in the conducted interviews of this research and in Yıldız and Büyükkasap (2011)’s study reported in the literature. In addition, right column of Table 3 shows the misconceptions detected for the first time in this study. As shown in Table 3, students, who gave responses based on modern physics, had the notion that ‘X-rays are scattered when they collide with a nucleus or pass close to a nucleus’. In the pre interview, student 12 related his idea with the animation which was about Rutherford’s alpha scattering experiment. He tried to relate two phenomena with each other.

In the pre test, most of the responses (37.5%) that were based on classical physics involved “charged light” view. These responses can be seen in Table 3. This kind of responses can be linked with students’ insistent and deeply rooted models that are based on classical physics. Students, who do not have Modern Physics concepts, try to explain phenomenon with Coulomb’s interaction. Students responded that “X-rays are formed by protons. They are repelled by a nucleus and their direction is refracted”. Here, students were basically using Coulomb’s Law. Such ideas involve Coulomb’s interaction and lack of mental models based on modern physics.

### Table 3: Misconceptions of students about Compton scattering

<table>
<thead>
<tr>
<th>Application</th>
<th>Both literature and this research</th>
<th>This research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test and interview</td>
<td>X-rays consist of protons, they are pulled by nucleus and are scattered. [Yıldız and Büyükkasap (2011)]</td>
<td>X-rays collide to nucleus and are scattered. X-rays are scattered when they pass near nucleus X-rays collide to nucleus and are reflected. X-rays can change their direction by colliding to electrons or protons. The more distance light covers, the more wavelength it has. If carbon takes electron form X-rays, X-rays are scattered. The magnetif field created by electron of carbon can affect X-rays.</td>
</tr>
<tr>
<td>Post test and interview</td>
<td>X-rays consist of electrons, they are pulled by electrons and are scattered. [Yıldız and Büyükkasap (2011)]</td>
<td>X-rays collide to nucleus and are scattered. X-rays are scattered when they pass near nucleus</td>
</tr>
<tr>
<td>Delayed post test and interview</td>
<td>X-rays collide to nucleus and are scattered. X-rays are scattered when they pass near nucleus The photoelectric effect and the Compton scattering are same.</td>
<td></td>
</tr>
</tbody>
</table>

The intuitive responses (30%) like “magnetic field which is created by electrons can affect the X-rays” and “Light, which strikes to carbon, scatters. Reason for increase in wave length as it scatters may be due to energy gained during stroke” are based on estimations rather than modern or classical physics concepts. Such students mainly made made predictive explanations which could not be based on any law.

One of the most common misconceptions that emerged in the pre test was “X-rays are scattered from the nucleus” view and students who held this view can be separated in two subgroups. First group consists of the students who think that X-rays involve protons and they are pulled by nucleus. Students in the second group were influenced by an animation about that was shown during teaching of ‘Structure of an atom’ unit in the grade 10 chemistry course and tried to explain Compton scattering by using the animation of Rutherford’s alpha scattering experiment.
Analysis results show that 67.5% of students gave scientifically acceptable responses in the post test. The responses, which were scientifically unacceptable and based on modern physics ideas, emphasized the notion that X-rays would be scattered when they hit or pass nearby a nucleus in the post test. As it has been mentioned before, Rutherford’s alpha scattering experiment creates a complexity for students, who use heuristic information processing and thus they experience a weak conceptual change. This condition can be seen in CRKM and CAMCC teaching models as peripheral cues. In this study, it has been proved that heuristic processing is one of the major problems and puts a barrier to conceptual change. We have proposed a hot construct metacognition to struggle with heuristic processing in this study, but there must be some other cognitive and affective factors that we should look for such as reasoning skills (Yıldız, 2008) or personal interests etc.

Only the misconception that we encounter after teaching is “X-rays collide with nucleus and are scattered”. Students, who give such responses, can be classified in two subgroups. First group of students like student 21 are those who can not be persuaded to use scientific idea despite the designed hot conceptual change model. Second group involves students who initially do not have the idea of “X-rays collide with nucleus and are scattered” but started believing to this notion after teaching. However, many students like student 12, who tried to make explanations by using Rutherford’s golden sheet experiment in the pre test and pre interview, were able to give full argument in the post test and post interview.

In the delayed post test, large majority of students (72.5%) responded scientifically acceptable explanations and the number of scientifically unacceptable responses based on modern physics ideas decreased to 12.5%. At this point, we need a closer look into the student 21’s conceptual change process. In the post test, student 21 asserted that “X-rays collide with nucleus and are scattered”, but in the post interview the same student gave full argument. When she was asked to explain the contradiction between these two expressions, she returned to her misconception. This finding implies that she experienced confusion between Rutherford’s alpha experiment and Compton scattering just after teaching. Obviously the Rutherford’s experiment has a negative effect on students 21’s conceptual ecology. However, the same student gave full argument in the delayed post test and delayed post interview. Here, we should pay attention to critiques made by Vosniadou (1994) and Vosniadou and Ioannides (1998) against to the structure of conceptual change theory that requires a rapid change in students’ mental states. In this sense, student 21’s conceptual change process supports the validity of critiques made by Vosniadou ve Ioannides (1998). Student 21 was navigating between the branches of tree in Thagard (1992)’s terms just after instruction, but a long time after instruction (i.e. five months after teaching) she changed tree as a long term outcome. Such a situation shows that conceptual change is a process which requires more time and experience for some students.

It can also be concluded that Rutherford’s golden sheet experiment may cause confusion in students’ mental structures. This indicates that students may process knowledge superficially which in turn cause weak conceptual understanding. It is revealed in this study that peripheral cues, which depend on superficial processing, are the most important barriers to conceptual change.

It is evident from this study that before teaching 67.5% of the students used scientifically unacceptable ideas but 67.5% and 72.5% of the sample have started to use scientifically acceptable ideas in the post and delayed post tests respectively. Despite all the criticisms made, these results show that Posner et. al.’s (1982) Conceptual Change Theory (CCT) is still succesful in implementing conceptual change.

In a broader sense, TMHCC, which was proposed within the framework of CCT, CRKM and CAMCC in this study, helped students to change their preconceptions towards scientific view. It is therefore suggested to consider metacognition as a factor in teaching for the students who process knowledge superficially. Additional activities are also needed to clear the differences between Compton’s and Rutherford’s alpha scattering experiments during teaching of Compton’s scattering. Finally, it is suggested that diagnosing conceptual change and providing new events that conflict with scientifically unacceptable ideas or concepts are required for meaningful learning after completion of teaching related concepts.
**WJEIS’s Note 1:** This study is part of the author’s PhD thesis (Mehmet Kural).

**WJEIS’s Note 2:** This study is presented as an oral presentation at 2nd International Congress on Education, Distance Education and Educational Technology- ICDET- 2016, Antalya-Turkey.

**REFERENCES**


THE OPINIONS OF GEOGRAPHY TEACHER CANDIDATES AND GEOGRAPHERS TOWARDS ONLINE LEARNING

Assist. Prof. Dr. Emine Teyfur
Ağrı İbrahim Çeçen University
Department of Geography
TURKEY
emine.teyfur.deu@gmail.com

Abstract
The methods used in the teaching of geography, affect student attitudes and achievement. Geographic education is a necessary part of a complete education. Technology is developing rapidly, therefore teaching of geography must be supported by technology. This is becoming more apparent as geo-spatial technologies including remote sensing and mapping tools have become critical to our economical success and governance in areas such as natural resource management, international commerce, transportation, risk management and national defense and security. The purpose of this research is to examine the perspectives of geography teacher candidates and geographers related to online learning. Qualitative and quantitative research methods were used together. For qualitative research interviews was carried out with 10 higher geography education students. Interviews were coded in qualitative research. In the sample of study, 435 people were included. Data collection tool was a “Student Attitudes Towards E-learning” scale which developed by Al Musawi in 2013. Required permissions for the scale were obtained from the researcher. The scale were revised before used in the study. Quantitative and qualitative research methods were used. SPSS was used in the data analysis. For qualitative research interviews was carried out with 10 geography students. Interviews were coded in qualitative research. The results obtained from the analysis reported that opinions of the students from Education Faculty and Faculty of Sciences and Literature to online learning have positive attitude.

Keywords: Geographic education, online learning, student attitude.

INTRODUCTION

Geographic education is a necessary part of a complete education. This is becoming more apparent as geo-spatial technologies including remote sensing and mapping tools have become critical to our economical success and governance in areas such as natural resource management, international commerce, transportation, risk management and national defense and security (www.ncge.org).

Alarmingly though, the PISA found that the frequency of ICT use at home is not proportional by use at school, and in most OECD countries, more than 80% of 15 year-olds use computers frequently yet a majority do not use them much in school (OECD, 2010). The environment for e-learning can be an online addition to a face-to-face course, a partially online hybrid course, or totally online. Online learning can employ low tech means of engaging students with simple web pages to high tech augmented reality applications and virtual environments like Second Life (Dittmer, 2010; Ritter, 2012).

In order to successfully deliver an online course, it requires a strong pedagogical strategy. This may require much more thought and reflection than is perhaps given to a traditional lecture series (Weller, 2002). With respect to undergraduate education, researchers support the use of GIS technology to help students develop geography skills (Drennon, 2005; NRC, 2006; Golledge et al., 2008), practice geography-based decision-making (Rutherford & Lloyd, 2001) and engage in real-world problem-solving (Summerby-Murray, 2001; Songer, 2010). Collaborative learning strategies have often been used as an effective strategy for online, group-based learning environments. Many studies have demonstrated the effectiveness of collaborative learning and collaborative communication on the online environment because of its flexibility, chances for better interactions, and technological support for reflective thinking and collaborative work (Ravits, 1997; Collins & Collins, 1996; Ward & Tissen, 1997). A lot of research has shown that, taken collectively, the geographers involved tend Innovation
and change in teaching and learning in higher education is associated with the use of computers and elearning in teaching and learning, to embrace innovation and change (Donert, 2007). Instructors need to move beyond the simple caching of web sites and invest time in designing thoughtful, user-friendly exercises that involve students in the learning process. The best opportunities for achieving this goal lies with the use of current weather, climate, river, plate tectonic, and sunrise/sunset data available on the web (Francek, 1999). In the process of working in an online group learning environment (Brown & Palinscar, 1989 transmitting by Joung, 2003), learners are encouraged to develop personal meaning via the flexible chances for interaction and fostered group-work. These two elements also allow students opportunities for learner reflection and support learner interaction due to the technological support.

METHODOLOGY

Study Design
Qualitative and quantitative research methods were used together. The purpose of this research is examine the perspectives of geography teacher candidates and geographers related to online learning.

Population and Sample
Randomized sampling type was used as sample groups in Turkey. Scale was applied geography faculty of education department students and to the students of science and literature faculty. Participants are the students who have taken the online lessons which Turkish and Ataturk's Principles and History of Turkish Revolution.

Participants
435 people (students) were included in the sample of study. Scale questions were asked to the students via the internet. Due to complete unfilled questionnaires, a total of 380 of geography teacher candidates and geographers opinions has taken into consideration.

Data Collection Tool
Data collection tool is a “Student Attitudes Towards E-learning” scale which was developed by Al Musawi in 2013. Required permissions for the usage of scale were obtained from the researcher. Scale were revised before used. Originally, the reliability of the scale was found 0,84 by Al-Musawi whereas it was found 0,78 for this research. Quantitative research and data analysis methods (triangulation) were used together.

Data Analysis
Quantitative research and qualitative data analysis methods (triangulation) were used together to determine the perspectives of geography teacher candidates and geographers related to online learning.

In quantitative data analysis were SPSS packet program for Windows. For qualitative research interviews was carried out with 10 geography students. Interviews were coded in qualitative research.

Figure 1: Gender of Participants
33.9% (129) of participants are female while 66.1% (251) of them are male who participated to determine the opinions related to online learning in the study.

![Type of School Distribution](image)

**Figure 2: The Distribution of Participants According to Type of School**

Distribution of participants who have participated in the study consists of Education Faculty and Faculty of Arts and Sciences. The number of participants from Education Faculty was 276 (72.6%) whereas the participants from Faculty of Sciences and literature was 104 (27.4%).

**FINDINGS**

**Findings of the Qualitative Analysis**

<table>
<thead>
<tr>
<th>Frequency of Use Internet Resources For Online Learning</th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Websites, e-mail, facebook, twitter, blog etc.</td>
<td>55.4%</td>
<td>22.3%</td>
<td>19.3%</td>
<td>3%</td>
</tr>
<tr>
<td>Websites, e-mail, facebook, twitter, blog etc. for online learning</td>
<td>53.2%</td>
<td>21.2%</td>
<td>23.6%</td>
<td>2%</td>
</tr>
</tbody>
</table>

According to the frequency of use internet based social media percentage value is 55.4 commonly used ones then the favorites often usage has been following 22.3. The percentage of sometimes users 19.3, never is 3%. According to this results the majority of preservice geography students are using web based communication. The percentage of using these resources for learning online value is closer (53.2). The findings of this research demonstrate that most geography students are using the internet for online learning. Rutherford’s (2010) research has found that university students use frequently social media. Research has indicated that there is a positive relationship between academic uses of technology and the occurrences of active and collaborative learning, and the frequency of student-faculty interactions (Laird & Kuh, 2005; Rutherford, 2010).
Table 2: Frequency Qualitative Interviews

<table>
<thead>
<tr>
<th>Positive Opinion(N10)</th>
<th>f</th>
<th>%</th>
<th>Negative Opinion(N10)</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>sharing and access course information useful and low cost</td>
<td>8</td>
<td>80</td>
<td>problems arise in social communication skills</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>to continue the positive contribution of the lessons outside the classroom</td>
<td>10</td>
<td>100</td>
<td>the high cost</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>shared information is many and varied</td>
<td>9</td>
<td>90</td>
<td>working on the computer for a long time</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>saves time and place</td>
<td>8</td>
<td>80</td>
<td>as a result of mental and physical fatigue</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>develop a sense of cooperation</td>
<td>7</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Qualitative interviews were made for interviews with 10 students. This students are science and literature faculty students(5) and faculty of education students (5).

According to table 8 students were mentioned that “sharing and access course information useful and low cost”. 10 students also expressed a positive opinion about continuing of their work outside class. 9 students mention the sharing many and varied which of positive results. Number of students who talking about acquisition the place and time are 8 as well as 7 students emphasized the positive side of the collaboration. Their negative consideration about online learning are social communication skills problems, high costs, as a result of mental and physical fatigue. To the results obtained from qualitative interview the students mention that also negative opinion, their ratio despite the low but it is important for the overall research.

![E-learning can solve many of the educational problems](image.png)

Figure 3: Distribution of Item 1: E-learning Can Solve Many Educational Problems

According to the answers to e-learning can solve many of the educational problems as the average percentage of students who participated in this opinion partially agree 50,8 %.
In the participant that disagree have stated and this area constitutes 24.2% of students. In this case, they don’t think completely online learning to solve a problem of education. A group of students reported that actually negative opinion. We can describe opinions of the participants stating that online learning they think would be incomplete in the geography teaching.

![Figure 4: Distribution of Item 2: E-learning Gives the Chance to Reinforce Student's Information and to His/Her Skills in the Field of Specialization.](image)

A large number of student are involved in this view. They partially agree with the second item. Most of the students reported at positive idea. E-learning gives the chance to reinforce student's information and to his/her skills in the field of specialization.

![Figure 5: Distribution of Item 3: Online Learning Makes Teaching and Learning More Flexible](image)

On the subject of “online learning makes teaching and learning more flexible” percentage of students about this item more positive opinion total 82.3 %. The number of people who don’t agree observed low (11.1). It is seen that the number of students positive opinion more than another. According to the results of the interview in this topic 7 student online learning is mentioned more comfortable.
Figure 6: Distribution of Item 4: Adopting E-learning As a Learning Style Shall Help Students Strike A Balance Between Study and Family Requirements

Opinion of student preservice about subject “adopting e-learning as a learning style shall help students strike a balance between study and family requirements” more positive. Percentage of students participating in partially agree is 42.7 % This constitutes almost half of the total number of students. The percentage of those disagree is %22. This result is quiet significant in terms of geography students for online learning perspective.

Figure 7: Distribution of Item 5: My Colleagues Advise Me to Use the Multiple Benefits of E-learning

The answer given to the item 5 “my colleagues advise me to use the multiple benefits of e-learning” geography students participated this part of the topic, the partially agree rate is 35,4% and don’t agree with rate is 35,6 %. Both of these benefits are considered to contribute to the level of student engagement, which has been determined to significantly impact student success (Kuh, 2001), Rutherford’s (2010). Smith and Greene (2013) research about pre-service teachers use e-learning technologies to enhance their learning. Participants judged the e-learning project as a very positive aspect of their teacher training. The students’ satisfaction towards the Web-Based Instruction using collaborative learning in group investigation technique to enhance analytical thinking of grade X students equal 3.85 from 5.00, which was at “high” level, shown that it could attracted the well-attention from the students. It provided learning tools available for active learning at all times. These were
discussion forum, source of knowledge, collaborative learning space, and online analytical thinking test. (Zhu, 2012; Sranamkam, 2015). In Europe many higher education institutions have planned to respond to these new student demands, specifically by providing courses and qualifications that suit the rapidly changing online opportunities (European Commission, 2005).

![Figure 8: Distribution of Item 6: I Think That E-learning Made the Learning Process More Enjoyable](image)

According to the Figure 8, 38.8% of participants have partially agreed that e-learning makes the learning process more enjoyable while 28% of them completely agreed, 16.1% of them do not agree, and 9.2% of them are undecided.

![Figure 9: Distribution of Item 7: I Believe That E-learning Has Contributed Little to Teacher-Student Interaction and Communication](image)

According to the Figure 9, 37.5% of participants have partially agreed that e-learning has contributed little to teacher-student interaction and communication while 28.5% of them completely agreed, 19.5% of them do not agree, and 9.2% of them are undecided. To the qualitative interviews 9 participants referred the «shared information is many and varied».
Figure 10: Distribution of Item 8: I Think That E-learning Has Limited Effectiveness in Improving Teaching and Learning

According to the Figure 10, 32.7% of participants have completely agreed that e-learning has limited effectiveness in improving teaching and learning while 30.9% of them partially agreed, 23.2% of them do not agreed, and 7.9% of them are undecided. They thought, e-learning has limited effectiveness in improving teaching and learning.

Figure 11: Distribution of Item 9: E-learning Saves Time For Both Teacher and Students

According to the Figure 11, 51.6% of participants have partially agreed that e-learning saves time for both teachers and students while 32.5% of them completely agreed, 11.4% of them do not agreed. E-learning Saves Time For Both Teacher and Students.
According to the Figure 12, 32.8% of participants have disagreed that e-learning had little impact on achievement while 25.3% of them completely agreed, 23.5% of them partially agreed, and 13.1% of them are undecided.

According to the Figure 13, 35.6% of participants have partially agreed that access to education is increased through e-learning while 22.4% of them strongly disagreed, 22.4% of them completely agreed, and 11.1% of them are undecided.
Figure 14: Distribution of Item 12: E-learning Has Created More Problems Than It Solved

According to the Figure 14, 29% of participants have partially agreed that e-learning has created more problems than it solved while 26.6% of them do not agreed. 12.4% of them completely agreed, and 23.7% of them are undecided.

DISCUSSION AND RESULTS

According to the answers to e-learning can solve many of the educational problems as the average percentage of students who participated in this opinion partially agree 50.8% . E-learning gives the chance to reinforce student’s information and to his/her skills in the field of specialization they partially agree with the second item. Most of the students reported at positive idea. On the subject of “online learning makes teaching and learning more flexible” percentage of students about this item more positive opinion total 82.3%. Percentage of students participating about subject “adopting e-learning as a learning style shall help students strike a balance between study and family requirements” are positive, in partially agree is 42.7%. This constitutes almost half of the total number of students. The answer given to the item 5 “my colleagues advise me to use the multiple benefits of e-learning” geography students participated this part of the topic, the partially agree rate is 35.4% and don’t agree with rate is 35.6%. These questions students may have not fully perceive as a result come out clearly. 38.8% of participants have partially agreed that e-learning makes the learning process more enjoyable while %28 of them completely agree. 9, 37.5% of participants have partially agreed that e-learning has contributed little to teacher-student interaction and communication while 28.5% of them completely agreed. Student that considers online learning reduce the student-teacher interaction. 32.7% of participants have completely agreed that e-learning has limited effectiveness in improving teaching and learning while 30.9% of them partially agreed. 51.6% of participants have partially agreed that e-learning saves time for both teachers and students while 32.5% of them completely agreed. 32.8% of participants have disagreed that e-learning had little impact on achievement while %23 of them completely agreed, 23.5% of them partially agreed. 51.6% of participants have partially agreed that e-learning saves time for both teachers and students while 32.5% of them completely agreed, 11.4% of them do not agreed. 32.8% of participants have disagreed that e-learning had little impact on their achievement while 25.3% of them completely agreed, 23.5% of them partially agreed for this item. 35.6% of participants have partially agreed that access to education is increased through e-learning while %23 of them strongly disagreed, 22.4% of them completely agreed, and 11.1% of them are undecided. 14, 29% of participants have partially agreed that e-learning has
created more problems than it solved while 26.6% of them do not agreed. 12.4% of them completely agreed, and 23.7% of them are undecided.

The results obtained from the analysis reported that opinions of the students from Education Faculty and Faculty of Sciences and Literature to online learning have positive attitude.

In contrast, opinions of the same students about items such as “has created more problems than it solved”, “had little impact on my achievement” are generally disagreed. Rutherford’s (2010) and Smith and Greene (2013) research about pre-service teachers use e-learning technologies. The result of all study is to enhance their learning participants judged the e-learning project as a very positive aspect of their teacher training.

According to results of qualitative interview coded the students’ interviews have given a positive opinion in the following subjects;
- Sharing and access course information use and low cost
- To continue the positive contribution of the lessons outside the classroom
- Shared information is many and varied
- Saves time and place
- Develop a sense of cooperation

The students mention that also negative opinion, their ratio despite the low but it is important for the overall research. These are: Arising in social communication skills problems. They thought about high cost and mental and physical fatigue issues. Their views should be taken into consideration to increase the effectiveness of online learning environment.

Although readiness (availability) level of the students related to e-learning environments are high, these environments should be also supportive to constructivist approach. The geospatial technologies used in teaching geography from geographic thinking skills, thus e-learning has been already encouraged by that. E-learning has provided favorable conditions for teaching geography, however it is required that both teachers and these conditions should be pedagogically well-designed.

Laurillard (2002) recommends that we, as academics, build a body of knowledge on how we could make best use of technology in learning. Online learning is offering us the opportunity to evaluate critically our pedagogies and our role as educator. Computers offers opportunities to store images and motion images in a wide area for a geography lesson unlike other lessons (Teyfur, 2010).

In the process of developing the online practical careful consideration was given to the constructive alignment (Biggs, 1999) of the learning objectives, content, learning process and assessment tasks. teaching approach, in that the learning process is designed to help students develop their capacity for research and their ability to ‘think like a researcher’. Further, the online practical highlights some key implications for learning design in scientific disciplines (Holbrook & Devonshire, 2005). As geospatial technologies become more accessible, it is imperative to do more research to understand not only how they can be used, but who should use them and how their use affects student learning. Songer (2010) states web-based co-operation in this context refers to communication and interaction among students or between student and the teacher on the web. Co-operation is thus something more than mere information acquisition. It can mean the use of e.g. e-mail, discussion forum (Newsnet News), chat, audio chat, video conferencing or desktop video conferencing (Houtsonen et al., 2004). The geospatial technologies used in teaching geography from geographic thinking skills, thus e-learning has been already encouraged by that. This situation may result in applicable geography teaching. But it should be noted the importance of field trip in geography teaching. Because field trip is the laboratory of geography science.

If online technologies in higher education are developed as supportive to lectures in formal environments, it would provide more flexible and equal education in teaching geography.


**References**


Joung, S. (2003). The effects of high-structure cooperative versus low-structure collaborative design on online debate in terms of decision making, critical thinking, and interaction pattern (thesis number: 3109292), Florida State University, USA.


National Council for Geographic Education [www.ncge.org](http://www.ncge.org)


ENHANCING STUDENT CRITICAL AND ANALYTICAL THINKING SKILLS AT A HIGHER EDUCATION LEVEL IN DEVELOPING COUNTRIES: CASE STUDY OF THE BRITISH UNIVERSITY IN DUBAI

Assist. Prof. Dr. Hanan M. Taleb
Faculty of Engineering
British University in Dubai
UNITED ARAB EMIRATES
hanan.taleb@buid.ac.ae

Prof. Dr. Clifton Chadwick
Faculty of Engineering
British University in Dubai
UNITED ARAB EMIRATES
hanan.taleb@buid.ac.ae

Abstract
Most higher education institutions do not systematically measure student learning and the extent to which their experiences lead to a growth in learning. It seems important to measure the degree of both general learning and development of critical and analytical thinking. Consequently, the primary objective of this project is to establish the degree to which a taught postgraduate education programme at a postgraduate university in a developing country develops student critical and analytical thinking skills. This paper will also investigate best practice and discover ways to promote critical thinking through identifying content and methodological issues, which may influence the ability of students to learn to think critically. The British University in Dubai (BUiD) was selected as the case study for this work and three different faculties with seven taught postgraduate programmes were covered. This study will use a major internationally standardised critical thinking (CT) test, administered first to the entry cohort and then again after students have completed their six modules. By comparing pre-test and post-test scores it is possible to establish whether these programmes do increase critical thinking skills. Surveys and interviews were also used; with the participants including students themselves, academics and senior management. The aim of these surveys and interviews is to identify content and methodological issues which may influence the ability to learn to think critically, as well as to identify demographic, social or cultural variables which may have an impact on that ability to think critically. The findings of this research may have significant value for other higher education institutions in the wider Gulf region.

Keywords: Critical Thinking, Higher Education, Developing Countries, BUiD, UAE.

INTRODUCTION
It appears that almost all academics delivering any postgraduate level study programme believe that developing the ability of students to think critically is very important and an essential goal of education. Economists suggest that the labour market values highly analytical individuals who can think from an abstract position.
This project will demonstrate whether the curriculum, teaching methods and evaluation of student learning as currently established in the master’s programme in different faculties achieves the goal of helping students to improve their critical thinking. The findings will be of importance not only to our institution but for any institution involved in postgraduate teaching in the region. It is worth mentioning here that the findings have the potential for saving money by providing information which may stimulate interest in the programmes offered. Furthermore, the findings may lead to the discovery of aspects of the programmes, which may be changed to improve overall quality in any higher education institution in any developing country.

LITERATURE REVIEW

“I assume critical thinking to be reasonable reflective thinking focused on deciding what to believe and do... (Ennis: 1985).” “When teachers refer to teaching for ‘critical thinking’ they typically mean teaching for analytic thinking. Teaching for analytical thinking means encouraging students to analyze, critique, judge, compare and contrast, evaluate, and assess” (Sternberg).

Teaching students how to be effective thinkers should be one of our highest priorities alongside teaching them to be both ethically and morally solid and to have integrity. The modern world requires that people become deeper and better thinkers in order to respond to and help shape the information-rich globe on which we live. It should be a given that all teachers want their students to be high quality thinkers.

There has been a major change in the economic and social environment throughout the world. This is an information revolution that is a key development in the role that information has come to play in the global economy. Information has become a major factor in production as well as a commodity or product which is sold on the market. This revolution can be seen as a result of technological advances which have brought about the vast expansion of the capabilities of computers – particularly small ones – allowing significant improvements in the production process and increasing the quality and quantity of goods and services available to the market. Exemplified by a fast evolution of technology in daily life, as well as in educational lifestyles, the Information Age has allowed rapid global communication and networking to shape modern society.

Not only does the increase in information help productivity, it also functions through new consumer products like computers, mobile phones, recording, video and text reading devices and applications such as productivity software and games. The revolution has also included a significant increase in innovations, patents and improvements in almost all fields from magnetic resonance imaging to hand-held inventory control devices in supermarkets.

In this new age jobs traditionally associated with the middle class - assembly line workers, data processors, foremen and supervisors - are beginning to disappear, either through outsourcing or automation. Individuals who lose their jobs must either move up, joining a group of ‘knowledge workers’ - engineers, attorneys, scientists, academics, executives, journalists or consultants - or settle for low-skill, low-wage service jobs. These ‘knowledge workers’ currently form about twenty per cent of the workforce and that percentage is growing. One basic aspect of their work is that they must know how to think analytically and be able to solve problems. They are able to compete successfully in the world job market and command high wages. How they work represents a major challenge to traditional content heavy and teacher-centered education. More than ever before knowing how to think clearly, logically and critically is becoming vitally important. Teaching students to become effective thinkers is becoming recognised as an important and immediate goal of education today.

Various participants take on different roles in learning to think (Chadwick, 2011) a basic explanation of how the roles of students and teaches intersect is outlined in Table 1, which also shows what should be happening and what does not happen.
Table 1: Aspects of critical thinking and roles of students and teachers (Chadwick, 2011).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Student’s Role</th>
<th>Teacher’s Role</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition Strategies</td>
<td>Learn the strategies &amp; apply them in their daily learning process</td>
<td>Teach the strategies to their students &amp; show them how the strategies improve acquisition, with attention on questioning.</td>
<td>Teachers mostly teach content not strategy. Parents often do not understand the nature &amp; role of cognitive strategies.</td>
</tr>
<tr>
<td>Metacognitive Strategies</td>
<td>Learn to reflect on what they are doing, how &amp; with what results, apply planning &amp; knowledge of results of thinking to improve acquisition &amp; performance.</td>
<td>Teach their students to reflect on what they are doing, mostly by prompting, &amp; show them how this improves acquisition &amp; performance.</td>
<td>Teachers do little to stimulate awareness of process and results. They are interested in content mastery.</td>
</tr>
<tr>
<td>Structure &amp; Logic</td>
<td>Search for the structure of the subject they are learning, &amp; develop a sense of logic in viewing learning.</td>
<td>Present content in such a manner as to highlight the basic structure of the subject they are learning, &amp; stimulate the use of logic in the learning process.</td>
<td>Teachers often have only a superficial knowledge of the structure of the subjects they teach.</td>
</tr>
<tr>
<td>Dispositions</td>
<td>Develop positive temperament toward responsibility, persistence, quality, truthfulness, etc.</td>
<td>Stimate, support, activate temperament toward persistence, quality, truthfulness, etc.</td>
<td>Teachers do take little responsibility for the child’s attitudes and dispositions.</td>
</tr>
<tr>
<td>Intellectual Standards</td>
<td>Become aware of the standards for high quality learning &amp; thinking &amp; apply them in the learning process</td>
<td>Become aware of the standards for high quality learning &amp; thinking &amp; teach students to apply them in the learning process.</td>
<td>Most teachers are unaware of the concept of intellectual standards except in an ambiguous &amp; general manner, so the standards are not an integral part of their teaching practice.</td>
</tr>
<tr>
<td>Problem Solving Skills</td>
<td>Learn, apply &amp; practice problem solving skills such as the analytic method, the pragmatic method, the intuitive method, etc.</td>
<td>Teach students how to apply content appropriate problem solving skills such as the analytic method, etc.</td>
<td>Teachers teach problem solving in unsystematic manners.</td>
</tr>
</tbody>
</table>

**METHODOLOGY**

A review of the literature on measuring critical thinking skills (Behar-Horensein :2011) indicates that there are many ways to measure the improvement of critical thinking in higher education systems. They include the Cornell critical thinking test (CCTT) (http://www.criticalthinking.com/cornell-critical-thinking-tests.html), Watson-Glaser Critical thinking Appraisal-FS (WGCTA-FS) and California Critical Thinking Skills Test (CCTST).

A standard CCTT will be used to monitor the critical thinking skills of students for this research project. The CCTT Level Z develops a clear picture of critical thinking abilities. The tests can be used to teach critical thinking skills, to predict student performance on state proficiency exams, or for honours/AP programmes. Level Z covers the skills of semantics, definition and prediction in planning experiments (http://www.criticalthinking.com/cornell-critical-thinking-tests.html).

Students will be given a pre-test upon entry of the program and a post-test upon completion of their modules. Student demographic data will be gathered as is currently the practice of BUiD. A validated questionnaire will be used to gather student opinions and comments after the completion of the second administration of the critical thinking test. Permission will be sought from BUiD for the use of student demographic data from student records. Confidentiality will be maintained as the proposed project will be implemented within the university.

Thirty two students participated in this first stage of the test. Only eighteen of these managed to take the test after completion of their master’s degree. Five from the Faculty of Education (FoEd) undertook education programmes, nine from the Faculty of Engineering and IT (FoE & IT) undertook Masters of Sustainable Design...
of Built Environment and four students from the Faculty of Business (FoB) undertook the MBA programme. All students were given fifty minutes to finish the exam for both the first and second test. Testing took place in 2013, at the end of 2014 and then at the beginning of 2015 when they had completed their master’s dissertation. Critical thinking improvement percentages were calculated based on the second stage results relation to those from the first. Table 1 illustrates student scores and results, the first row for each student represents the first stage and the second represents the second stage test.

An online survey was sent to all the current students at BUiD in different departments. The aim was to examine their progress in terms of developing critical thinking skills during their studies. 214 viewed the electronic survey, 151 students started and then fifty one dropped out leaving a hundred students who completed the survey in its entirety. The response rate was high at some sixty six per cent. For a full list of questions, please refer to Appendix (A).

The survey was also sent electronically to BUiD academics. The aim of the survey was to obtain their thinking on the results and to explore whether they were implementing methods of critical thinking in their teaching style and discussing ways to improve. Twenty seven academics viewed the survey, seventeen began to complete it and just five dropped out. This meant that twelve academics completed the survey, representing a seventy per cent response rate. For a full list of questions, please refer to Appendix (B).

As a method of triangulation, interviews were conducted with four Deans at BUiD as well as two decision makers after presenting them with a copy of the results. For a full list of questions of the interview, please refer to Appendices (C) and (D). The aim was to investigate their potential to promote critical thinking and find more ways to stimulate it among academics. Qualitative Triangulation involves a conscious combination of quantitative and qualitative methodologies as a powerful solution to strengthening a research design based on the fact that a single method can never adequately solve the problem of rival causal factors( De Vos: 1998). It is worth mentioning here that Methodological Triangulation entails combining both quantitative and qualitative data collection methods (Banister, Burman, Parker, Taylor, M. & Tindall,:1994). This is based on the rationale that a single data collection method is insufficient to provide adequate and accurate research results. Outside the quantitative section, this study is focused on assessing critical thinking level for students, so it will adopt qualitative methods for analysis. There are many types of qualitative analysis including: basic, phenomenology, ethnography, ground theory, narrative analysis.

Table 2: Summary of results of critical thinking test

<table>
<thead>
<tr>
<th>Student N.</th>
<th>Facul ty</th>
<th>Date of first test</th>
<th>Date of second test</th>
<th>Time taken to finish the test</th>
<th>number of unanswer ed questions out of 52</th>
<th>number of questions right out of 52</th>
<th>number of wrong out of 52</th>
<th>Score (%)</th>
<th>Critical thinking Improvement Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FoEd</td>
<td>2/3/2013</td>
<td>3/12/2015</td>
<td>47</td>
<td>0</td>
<td>38</td>
<td>14</td>
<td>73%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36</td>
<td>0</td>
<td>41</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FoEd</td>
<td>4/4/2013</td>
<td>7/11/2015</td>
<td>49</td>
<td>3</td>
<td>22</td>
<td>27</td>
<td>42%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36</td>
<td>1</td>
<td>26</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FoEd</td>
<td>1/3/2013</td>
<td>29/1/2015</td>
<td>50</td>
<td>4</td>
<td>24</td>
<td>24</td>
<td>46%</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>46</td>
<td>0</td>
<td>30</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FoEd</td>
<td>5/4/2013</td>
<td>3/4/2015</td>
<td>50</td>
<td>0</td>
<td>30</td>
<td>22</td>
<td>58%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37</td>
<td>0</td>
<td>35</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FoEd</td>
<td>13/3/2013</td>
<td>6/2/2015</td>
<td>48</td>
<td>1</td>
<td>18</td>
<td>33</td>
<td>35%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37</td>
<td>0</td>
<td>21</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>FoE. &amp; IT</td>
<td>19/3/2013</td>
<td>3/11/2015</td>
<td>49</td>
<td>2</td>
<td>23</td>
<td>27</td>
<td>44%</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33</td>
<td>0</td>
<td>39</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>FoE. &amp; IT</td>
<td>3/2/2013</td>
<td>17/11/2015</td>
<td>50</td>
<td>4</td>
<td>18</td>
<td>30</td>
<td>35%</td>
<td>34%</td>
</tr>
</tbody>
</table>
This study has, however, adopted the critical research approach where the goal is not only to study and understand but rather to critique, challenge, transform and empower (Merriam, 2011). For the interview with the Deans and their constrained time, a structured interview was used. This method features a rigorous set of questions from which one is not permitted to divert. For a full list of interview questions with Deans, please refer to Appendix (C).

When the two decision makers were interviewed, a semi-structured interview method was used. This is an open method, allowing new ideas to be brought up during the interview as a result of what the interviewee says. The interviewer in a semi-structured interview generally has a framework of themes to be explored. For a full list of interview questions, please refer to Appendix (D). In writing the questions, many sources helped with setting them and most came from a book on research design (Creswell, 2014).

RESULTS

In this section results will be presented from the students, academics and Deans. The last section will be devoted to the decision maker interviews. It was decided to leave some questions open-ended because this offers many advantages including acquiring an unlimited number of possible answers, revealing the logic of a respondent logic, thought processes, frames of reference and finally some unanticipated findings may be discovered.
**Student perspective**

The first question asked which faculty the student was studying in. 58.59% of the participants were from the FoE & IT, representing the highest percentage. Following them was the FoB who represented 24.24% of total participants. Finally, 17.17% of the participants were from the FoEd. Students were then asked about the number of modules they had completed so far, fifty one had completed six modules, twelve had completed five, ten had completed four, six had completed three, thirteen had completed two and finally seven students had just completed one module so far. Question three asked whether they were familiar with the term ‘Critical Thinking’, ninety students were positive and ten answered negatively. The next question was to find out that if they believed that BUId tutors were trying their best to increase ‘critical thinking skills’ in themselves. Seventy two per cent confirmed that they had this trust in their tutors leaving twenty eight per cent who held a negative view. The percentages for the flowing questions were not that far from the latter. Seventy four per cent of the students believed that their critical thinking skills had been increased since joining BUId. Most of these participants were from the group that believed BUId tutors were trying their best to increase their critical thinking skills. The rest were still denying that they gained those skills representing twenty six per cent of participants. The next question was about the student’s own role in increasing critical thinking skills and to what extend they were keen to apply them. The students were asked to rate themselves on a sliding scale.

In order to quantify student assessment of themselves in terms of critical thinking, they were introduced to the six aspects of critical thinking mentioned earlier in the literature review section (see Table 2) along with a definition for each aspect including: acquisition and metacognitive strategies, structure and logic, dispositions, intellectual standards and problem solving skills. It became apparent that most of the student rates were close to each other and that problem solving skills scored the highest among the six factors. This skill relates to analytical, pragmatic and intuitive methods and how these can help students to practice problem solving skills (see Figure 1).

Finally, yet importantly, they were asked what things they think that BUId lacks in terms of tools, resources or instruments that may be of benefit to the promotion of critical thinking. Since this question was open-ended, many students stressed the point of a lack of hands-on work – in terms of physical work or experiments to develop critical thinking through experience. The need for laboratories with updated software and training services was also highlighted.

**Academic perspective**

Eleven academics completed the survey out of the twenty seven who viewed the survey online. The completion rate was seventy per cent, excluding the five who dropped out and the average timing to complete the survey was 6 minutes. The eleven academics include four from the FoEd, five from the FoE & IT and one from FoB. All the academics confirmed that they were aware of the concept of critical thinking. When the academics were asked whether ‘increasing critical thinking among students’ was one of their module outcomes, ten of them confirmed it was and only one said no.

Table 1, which illustrates the aspects of critical thinking and roles of students and teachers, was shown to the academics. They were then asked to what extent they were keen to apply and also asked also to rate themselves. Figure 2 collates their responses.

Comparing the results with Figure 1, it seems that eighty one per cent of students eighty eight per cent of academics think that they apply problem-solving skills – very similar figures.

When it came to their perception towards the summary of the results of the critical thinking test (Table 2) most of the academics from FoE & IT were very happy and positive that their students achieved the highest results. Some were somewhat frustrated and expressed some concerns with regard to the time taken by each student. Others statements included “Would such a small number of student sample be enough to arrive at a conclusion” and “others may need more attention to develop CT”.

COPYRIGHT © JOURNAL OF EDUCATIONAL AND INSTRUCTIONAL STUDIES IN THE WORLD
Figure 1: Student roles in increasing ‘critical thinking’ skills and to what extent they are keen to apply them

Dean’s perspective

The Deans of four different faculties were interviewed and the average time taken was ten minutes. All four confirmed that they are aware of the concept of critical thinking. The four Deans all teach alongside their administrative responsibilities and all confirmed that increasing critical thinking among students was one of their module outcomes. They were also shown Table 1 and asked to rate themselves. Similarly to the academics, they gave skill number six the highest score of 85.25%. They were then asked “What things do you think that we lack at BUiD in terms of tools, resources or instruments that may be of benefit in promoting critical thinking?” Responses included communication with staff and students from top universities, more assignments and fewer exams and labs and instruments that encourage students to study and test ideas that are of interest to them even if they are not part of any module.
They were then asked how, as Deans, they can encourage their faculties to improve critical thinking levels among BUiD students. Their suggestions included the Board of Studies – a faculty meeting on a regular basis - being used to develop module descriptors which incorporate assessment tools that promote critical thinking. Peer review of lectures was another suggestion, as was providing a stable set of modules to teach with innovation required routinely each year in terms of teaching and learning design. The Dean of research stated that “we need to educate the staff first about what this means then get buy in from them, not an easy task”. The Dean of education suggested adding an outcome to all modules to insure that it is properly incorporated.

Decision maker perspective
Two decision makers were interviewed - one being the Vice-Chancellor of BUiD and the other the Registrar, both of them having the power to implement new regulations at BUiD. Audio recording was utilised to capture their response to each question. One of the decision makers began by highlighting the importance of critical thinking by saying “CT power is here, it’s a big determinant or a shaper of society and it is important to understand in arguments how power works. How it influences the dynamics or dominance of working to get you to believe in an argument”. It was also mentioned that critical thinking is important within research and developing from a bachelor degree to a more advanced level of study. At master’s level, people are able to pick up an argument in a different way if that claim is not supported by the evidence. One can claim only what one has evidence for and there is an active persuasion going on in an argument. This means that how a story is told...
sustained story is really an essential factor for moving on to more advanced study. We have to be able to read other people’s arguments and then be able to produce our own.

Among the six skills of critical thinking in Table 1, the two decision makers picked the acquisition strategy as the most important factor. It is vital to teach these strategies to students and show them how those strategies improve acquisition and attention to questioning. One decision maker thought that workshops should be held at BUiD for academics to stress the concepts behind critical thinking and how to implement it in class. The curriculum should clearly include critical thinking activities and assessments, whether examinations or assignments, should be partially based on critical thinking concepts. External reviews should also be informed to comment on whether critical thinking is apparent in exams and assignments. There was a suggestion of a lack of proper training for academics, meaning that critical thinking skills were not transferable to students. BUiD should be happy to arrange such programmes and fund it.

Assessment tools of the level of critical thinking improvement are required to assess how successful academics are in implementing the concept. As an unstructured interview question, a question came up when one decision maker mentioned different social contexts; “Do you believe that there is an influence of each culture on critical thinking? Can we classify, for example, developing countries and developed countries? Can you argue that there is a difference? Unexpectedly, the answer was negative as the participant thought there was no difference in developing or developed countries when it comes to critical thinking, simply believing in the capacity of everyone to learn and develop. It is just a question of if somebody has had that moment of understanding to enable the light bulb to come on. There was mention of how an hour long conversation about critical thinking with a PhD supervisor changed the way the participant thought about the meaning of the word ‘critical’.

Both decision makers were asked “how can we promote critical thinking among staff and students?” One responded “by selling the benefits, to show them that if they do such a style they can be constructive, they will have higher quality work from their students and their job will become easier. To teach critical thinking must be an abstract thing to say, so I think you will need to give people the tools.” Another said workshops at BUiD for academics stressing the concept and how to implement it in class, curriculum should clearly include critical thinking activities and that assessment, whether by examinations or assignments, should be partially based on critical thinking concepts. External reviews should be informed to comment on whether critical thinking is apparent in examinations and assignments.

One respondent thought that there are many different ways academics can be developed. Some could have a supervisory session with a professor and student, just intervening as a role model. This is in order to have a supervisory conversation with the student, introducing critical thinking to the curriculum. The last question was about formulating new policies within BUiD to enhance critical thinking. One response was that there is a need to persuade and negotiate with academic colleagues and a need to provide them with supportive tools and an atmosphere where they can develop organically. Instead of a policy, it was suggested that levels of awareness should be raised and that BUiD has to take this forward and improve what they do.

**DISCUSSION**

Critical thinking is an important issue in education and has become quite a buzzword around institutions at both undergraduate and postgraduate level. Obviously, the general perception of the BUiD results was a bit disappointing for many who think the assessment of critical thinking skills is somewhat problematic. One of the suggestions was to teach critical thinking using a single subject unit as a vehicle for action learning. Others think that critical thinking requires academics to elevate the mental workflow of their students beyond just memorisation. In addition, there was a suggestion that education in the Middle East is still too like spoon feeding and in order to promote critical thinking, academics should not jump in to help immediately.

Some students commented that the problem was most of them did not learn how to research until they started their postgraduate degree and that there is a strong link between research and critical thinking skills. Another interesting factor revealed by one of the academics is that religion is a factor for critical thinking,
confirming that some Muslims find it very difficult to switch places and look from a non-Muslim perspective at some problems. There is a strong influence of Islam on Muslim brains, rejecting anything that conflict with its principles and limiting the brain from thinking critically.

A combination of logic problems and lateral thinking exercises can potentially be used to enhance the critical thinking skills of students. From a developing or developed country perspectives there are a few minor differences. Although critical thinking deals with the way that students think and as well from religious influences, it is not taught in the earlier years of higher education. Critical thinking is a skill which should grow as long as students continue to grow, but it is difficult to gain the skill at postgraduate level if students do not have a strong background in this area. One academic believes that putting students in group learning situations is the best way to foster critical thinking where they are asked to reflect on lessons, write questions and obtain different views and opposing opinions. An interesting recommendation by one of the Deans was to focus on creating new and innovative critical thinking activities that are shared between programmes and faculties.

CONCLUSION

Critical thinking is a controlled mental activity involving evaluating opinions and arguments or plans and coming up with judgments that can guide the development of beliefs and taking action. The aim of this study was to enhance critical and analytic thinking skills at a higher education level in developing countries. The British University in Dubai acted as a case study for this research. To fulfill this aim, a mix of methodologies were used, first applying a formal critical thinking assessment instrument as a pre/post treatment experiment, that treatment being the Cornell CT test Level Z. The researchers then used a wide range of surveys to obtain the student perspective as well as that of the academic staff. Finally interviews were carried out to obtain the perspective of the Deans and decision makers. The main findings include the suggestion that creating a single module for teaching critical thinking would be useful rather than formulating a new regulation or policy. Enhanced awareness of the concept among academics and encouraging them to apply critical thinking objectives to their module outcomes was also suggested. Provision of social learning environments such as those inherent in peer group works and small group activities to allow students to see other points of view was another recommendation. Preparing a healthy environment can help students to enhance their critical thinking skills and design appropriate educational experiences. Furthermore, the results show that critical thinking levels have a positive impact even on master’s level students. Interestingly, carrying out this research has also had the unexpected impact of raising the awareness of critical thinking among the academics at BUiD.

WJEIS’s Note: This study is presented as an oral presentation at 2nd International Congress on Education, Distance Education and Educational Technology- ICDET- 2016, Antalya-Turkey.

REFERENCES


