

Studies in Subject Specific Education

Editors

Ömer Tuğrul KARA
Ömer Gökhan ULUM

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PREFACE

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Chapter 1

A CRITICAL INQUIRY ON GENDER IDEOLOGY IN EFL TEXTBOOKS–WITH AN EMPHASIS ON THE VIEWS OF TURKISH STUDENTS

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INTRODUCTION

Lincoln and Denzin (2003) maintain that critical theorists have made considerable efforts to devise and construct pedagogy of resistance within communities that care for a difference. The pedagogy of resistance refers to the empowerment of the marginalized, the poor, the nameless and the voiceless. Critical pedagogy, as Kubota and Austin (2007) note, motivates teachers and students to criticize caveats to critically ponder how unequal relations of power using domination and subordination are produced and maintained. The concept of power in Foucault (2000) refers to complicated power relations and strategies. Traditional theory has always aimed to comprehend and explicate society. Critical theory, in contrast, is the main social theory directed towards transforming society radically (Horkheimer, 1972; Tyson, 2014). Therefore, an EFL/ESL curriculum that includes critical pedagogy can emphasize the importance of an inevitable outcome of historical and economic development which is a result of a complicated network of power dynamics, and its present position is the consequence of active promotion by ones who benefit from its spread (Huang, 2009).

In social sciences, the concept of critical theory has various meanings in various historical contexts (Denzin & Giardina, 2016; Kellner, 1989). Critical Theory conceptualizes both a narrow and a wide sense in philosophy and in the past of people. In the narrow sense, it mentions specific contemporary philosophers from Germany and social theorists from a European Marxist institution known as Frankfurt School representatives covering Max Horkheimer, Erich Fromm, Leo Lowenthal, Herbert Marcuse, and Theodor Adorno. Though the narrow sense of critical theory was formed by Frankfurt School, it is also favoured among other

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Chapter 2

MATHEMATICS AND SCIENCE EDUCATION STUDENTS' CONCEPTUAL UNDERSTANDING AND ERRORS OF METRICS AND NEIGHBORHOOD

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INTRODUCTION

In the broadest sense, conceptual knowledge refers to knowledge of concepts, principles and definitions (Barody, Feil, and Johnson, 2007; Byrnes and Wasik1991). Hiebert and Lefevre (1986, p.18) defined conceptual knowledge as “knowledge that is rich in relationships” and as “a connected web of knowledge, a network in which the linking relationships are as prominent as the discrete pieces of information”. Skemp (1978, 1987) considered mathematical understanding as a relational and rule-based understanding that is fundamentally similar to conceptual and procedural understanding. Conceptual knowledge can also be defined as conceptual understanding (Anderson, 2000; Rittle-Johnson and Schneider, 2015; Star, 2005; 2007). Hiebert and Lefevre (1986) considered conceptual understanding from a relational perspective and stated that conceptual understanding started to emerge and develop as a result of the individual’s effort to establish relationships between pieces of existing knowledge and new information incoming to his or her mind.

According to Post and Cramer (1989), conceptual and procedural understanding are two types of understanding that are completely opposite to each other and have distinct natures that are not related to each other. Conceptual knowledge is often measured with verbal or written questions asked to the individual during standard or clinical interviews (Ginsburg, 1997).

Mathematics has a language of its own. Learning this language requires having knowledge of the concepts of it. Concepts, such as limit, continuity and convergence of a function are fundamental concepts of mathematics. Each one of these concepts is defined with the $\varepsilon - \delta$ method. The notion of open neighborhood is the basis for the $\varepsilon - \delta$ method. The notion of the open neighborhood on \mathbb{R} is defined based on the absolute value metric or, in other words, the Euclidean metric.

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in the development of this situation as these systems encouraged rote learning, cheered procedural knowledge, measured knowledge based on rules, formulas and operations, and played an active role in determining individuals' choice of their future professions. Since mathematics courses in secondary education are not presented with a conceptual perspective but taught through memorized formulas and rules, mathematics subjects are memorized instead of being learnt.

Findings from various studies showed that students' procedural knowledge was not permanent and functional. These studies also revealed that students' procedural and conceptual knowledge was not balanced in the learning process and that procedural knowledge was emphasized more. Therefore, students tend to memorize mathematics subjects instead of learning them because there is little emphasis on a conceptual learning approach in mathematics lessons. Unfortunately, most students are not aware of the presence of concepts underlying the procedures they use and they do not realize what mathematics actually means. They believe that learning mathematics is solely the process of performing procedures and computations on meaningless symbols and they try to learn mathematics by just memorizing (Soylu and Aydın, 2006). In conceptual learning, on the other hand, the student is a problem solver who can use his or her own creativity and intuition in problem-solving and producing mathematical knowledge (Baki and Bell, 1997).

Students are admitted to universities after exam-oriented high school education. During this education, students are usually expected to perform algorithmic computations and to perform these computations quickly. As suggested by Harel and Sowder (2005), it can be recommended that students should be taught about solving conceptual problems and questions that require proofing skills before coming to university. Finally, mathematical language arguments, such as symbols and quantifiers, which have an important place in mathematics, should be emphasized in mathematics curricula.

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Chapter 3

THE EFFECT OF MATHEMATICS COURSE PREPARED ACCORDING TO BRAIN-BASED LEARNING ON THE ACHIEVEMENT OF FOURTH-GRADE STUDENTS

Nezaket İlksen KANBUR¹

Dilek SEZGİN MEMNUN²

Selin ÇENBERCİ³

INTRODUCTION

Our brain is our organ that manages our consciousness and emotions. To use our cognitive and emotional aspects with high performance, it is important to know the functioning of the brain, how thoughts and emotions are produced, and the stages of the brain in this process. In the education and training approach required by the age, individuals who learn to think and use their mental processes actively are needed, instead of individuals learning what is taught (Duman, 2015). In this respect, Mathematics education supports the ideas we have about the world we live in and the environment we are in, the gains we can achieve through mutual interactions, and brain-based education is seen as an auxiliary element (Özdemir & Sadık, 2016). Brain-Based Learning, which is a learning theory that evaluates learning cognitively and neurophysiologically (Özden, 2003; Sönmez, 2004) handled as a model in other words (Gülpınar, 2005), emerges as a popular theory targeting the physiological changes in the brain and permanent learning as a result (Jensen, 2006). The basic principles of Brain-Based Learning theory were revealed by R.N. Caine and G. Caine, who were among the pioneers in the field of education with their studies on this theory (Caine & Caine, 1991). Caine and Caine, defining the three-stage Brain-Based Learning model; determined the principles that provide important information by contributing to the design of teaching a course lecture in accordance with the Brain-Based Learning model (Ada, 2016) and in the light of researches about the brain, have revealed the lasting and meaningful effect of the functioning of the brain on learning and also 12 basic principles in the field of Brain-Based Learning (Caine & Caine, 1990; Cited in

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an environment suitable for Brain-Based Learning, has a positive effect on student achievement and views. In the research conducted in the field of Brain-Based Learning (Erduran, Avcı & Yağbasan, 2010; Yavuz & Yağ, 2013), as a result of the interviews with the students, the findings of the study indicating the positive feelings and thoughts of the students towards the courses supports the result of this research.

SUGGESTIONS

Based on the results of the study, the following suggestions for future research and studies are presented:

1. This study was carried out with the fourth-grade students of Primary Education. Based on the data obtained from the study, the instructional design made with the ASSURE model suitable for the Brain-Based Learning environment can be applied in different grades and branches, and the results can be examined.
2. When the literature is analyzed, it is seen that there is no research related to the instructional design for the Mathematics lesson carried out within the framework of the ASSURE model based on Brain-Based Learning at the primary level. Accordingly, instructional designs made in the framework of the ASSURE model suitable for Brain-Based Learning in Mathematics and different courses at the primary level can be realized in different courses and their effects on students can be examined.
3. Considering that the material used in the framework of the educational design in accordance with the ASSURE model and the educational environment carried out in an educational environment suitable for Brain-Based Learning, the Mathematics course taught with the applied activities positively affects the academic achievement and student opinions of the 4th-grade students, so design examples, methods, techniques and activities that can be used in the implementation of instructional designs in accordance with the ASSURE model can be given more in the courses taught in primary school.

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Chapter 4

CO-TEACHING PROCESS AND EDUCATIONAL ARRANGEMENTS IN GENERAL EDUCATION CLASSROOMS

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INTRODUCTION

The individual continues the learning process, which starts in the family in the schools within a certain program. Nowadays, the schools have been going through a series of changes to support the academic, social and emotional skills of the students. Especially the changes in science and technology cause changes in the educational policies of the countries about the knowledge, skills, and competencies that should be gained by the students in school life (European Union-EU, 2019, United Nations Treaty Collection- UNTC, 2006, Schleicher, 2018). Examining the European Union-EU (2019) and The Organization for Economic Cooperation and Development-OECD (2012) reports, it has been seen that the prominent topics in the educational policies of the countries, especially in the early childhood education, life-long learning and access to education are right-based education and individual differences (Schleicher, 2018). In this regard, education and training are considered as a whole, the access of the individual to the quality education seems to relate to the appropriate curriculum, teaching methods and techniques, physical adaptations and teacher competencies (Diken & Batu, 2010; Rivkin, Hanushek & Kain; 2005; Sucuoğlu & Kargin, 2006).

To meet the educational needs of the students who show significant levels of difference in academic, social, language and other developmental areas, the learning environments should be arranged, and the special education knowledge and skills of the teachers have a crucial role for this arrangements to succeed (Gürgür, 2005; Kayhan, 2020; OECD, 2005; Piştav Akmeşe, 2020; Scruggs, Mastropieri & McDuffie, 2007). Hence, the teacher is the primary responsible for the teaching in the classroom, and forming a quality educational environment for each learner is closely related to the pre-vocational teacher training programs

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show differences in developmental characteristics, academic, social and other areas.

- Observable long-term and short-term targets should be developed for the students by taking the opinions of the family, student and counseling services.
- Content, material, environment and support service planning should be done to support the participation of the students with special needs in the general education curriculum.
- Performance-based monitoring assessment studies should be included, the assessment methods and techniques

Suitable for the student should be recorded for IEP with their reasons.

- It is suggested both be an individual learner in the classroom and to adopt the culture of “being included in” the co-learners group. For this, family visits, meetings, activities, and picnics can be arranged.
- The number of visual materials that will distract the attention in the teaching period should be decreased; concrete materials that will assist learning should be increased.
- The teacher should be a role model with the tone of voice, use of gestures and facial expressions. The principle of unconditional acceptance of the student should be valued.
- Attention should be paid to speaking face-to-face; every student should be given right the talk without an exaggerated tone of voice.
- Include frequent revisions and short written memos, make sure that the homework is clearly explained.
- Give your students additional time to process the information.
- Responsibility sharing can be contributed by including peer mentorship.
- Counseling services should pay attention to keeping confidential information within ethical rules, not causing emotional harm to the family and the student.
- Attention should be paid to provide appropriate arrangements in terms of equipment, environment, and material for the students who need support in any hearing, visual, physical and mental areas.

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Chapter 5

AUDIO-VISUAL PORTFOLIO: AN ALTERNATIVE WAY OF SPEAKING ASSESSMENT

Serpil TEKİR¹

Portfolios have been in use in English as a Foreign Language (EFL) classes for different skills for a long time. However, electronic portfolios, which emerged with the development of the digital age as an alternative to paper-based portfolios, are new in the EFL context. Therefore, there is a lack of evidence on how they influence the language learning process and what highlights and challenges they bring to the EFL classroom. With this respect, the primary purpose of this study is to examine a type of electronic portfolio, namely Audio-Visual Portfolio (AVP), its effectiveness, advantages and disadvantages as an alternative speaking assessment tool. The study is descriptive using a mixed design. Quantitative data were collected from 120 Turkish university students studying at an English preparatory program at a state university through questionnaires and the qualitative data were collected from 12 students through semi-structured interviews. The findings revealed that students have positive attitudes towards the alternative speaking assessment tool and it seems to bring about an improvement in students' speaking skill, their motivation, autonomy and a significant decrease in their speaking anxiety.

INTRODUCTION

Because of the great emphasis on constructive teaching methods in English language teaching in recent decades, there has been a shift from standardized tests to alternative assessments. Different from traditional assessment, alternative one requires students to take more responsibility for their own learning (Brown, 1998). Portfolios are among the most frequently used alternative assessment methods. Because of the several benefits they offer, portfolios have been in use as a tool of authentic assessment for long. Depending on teaching objectives and curriculum, different language teaching institutions implement different portfolios. Some prefer paper portfolios, while some others use electronic ones. Especially after the technology has gained importance in language teaching, the use of portfolios involving technology has become very common as tools to improve and evaluate

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feedback. AVP also seems to increase learner motivation and decrease speaking anxiety by offering more speaking practice opportunities and increasing their self-confidence in speaking. On the other hand, it is likely to require a lot of time and effort from learners, especially from less autonomous ones, who need teacher guidance more. To conclude, the present study has added to our knowledge of electronic portfolios by giving us specific information about the Audio-Visual Portfolio, its effectiveness as an alternative oral assessment way and the advantages and disadvantages it brings into EFL classes. The qualitative and quantitative data collected in this study suggest AVP as a promising alternative way of assessing students speaking performance.

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Appendix A: Questions in the Questionnaire

1. AVP is a good evaluation tool for speaking skills.
2. The speaking tasks in my AVP allowed me to demonstrate my speaking skill ability exactly as it is.
3. As compared to the first days of using the AVP, now I feel more positive about it.
4. Speaking for the AVP in front of the video camera didn't reflect the speaking experiences that I will have in real life.
5. The positive sides of preparing an AVP are more than its negative sides.
6. The AVP was a good tool for me with respect to the demonstration of my speaking ability.
7. I would like to go on doing AVP work the following semester.
8. Thanks to the AVP, I can now follow my progress in speaking more easily.
9. I found it useful to make the selection of the speaking activities to be put into my AVP by myself.
10. Thanks to the AVP, I have learned how to correct my speaking mistakes.
11. I need the instructor's guidance in deciding what to focus on when evaluating my speech in the AVP.
12. I think instructors can evaluate our speaking performance better than we do.
13. The questions that I answered for my AVP helped me gain awareness for my future AVP speeches.
14. After watching the video recordings, it is easy for me to evaluate my own speaking performance.
15. Watching the presentation later, which is a part of my AVP work, helped me evaluate myself.
16. The AVP helped me reflect on my speaking performance.
17. The AVP helped me see my strengths and weaknesses in speaking.
18. Thanks to the AVP, I can now evaluate my individual or group work speaking performance more objectively.
19. While we were watching the video recordings, the corrections my classmates made helped me realize my mistakes.
20. Listening to the speaking samples of my classmates helped me improve my AVP.
21. I found it useful to listen to my classmates' speaking performance samples.
22. I found it easy to evaluate the speaking performance of my classmates.
23. Listening to my classmates' speeches enabled me to understand in which ways my own speaking performance was complete or incomplete.
24. It took me a lot of time to prepare the AVP in class.

25. It was easy for me to complete the AVP.
26. I expended a lot of effort when preparing the AVP.
27. I spent a lot of time preparing the AVP.
28. Thanks to the AVP, I have become more motivated to learn English.
29. The AVP served to ease my fears related to speaking in English.
30. I felt nervous and anxious during the AVP talks.
31. During my AVP talks, I was afraid to make a mistake.
32. The AVP increased my motivation to speak in English during classes.
33. The AVP enabled me to participate in the classes more actively.
34. The AVP enabled me to practice speaking on a regular basis.
35. The AVP contributed to my speaking skills in the following aspects:
a Planning my talk b Stress c Intonation d Vocabulary e Grammar
36. Preparing the AVP enabled me to reinforce what I learned related to speaking English.

Chapter 6

TEACHING THE SUBJECT OF NUMBERS USING ORIENTEERING IN THE FOURTH-GRADE

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Dilek SEZGİN MEMNUN²

INTRODUCTION

For an effective education, it is required to get to know the child in all aspects, determine his/her needs and created learning environments that should be child-oriented. To perform an effective teaching, it is necessary to prepare an effective learning environment. Especially in the primary school years occupying an important place in one's educational life, it is rather important that the learning environments prepared for children should attract their attention, arouse curiosity and provide them with environments in which they can participate actively. In effective learning environments, children's basic learning needs are met (Çiftçi, 2005). Basic learning needs are the knowledge, skills, values and attitudes which enable children to live and gain a place in society. Being literate, able to express emotions, do numerical operations, solve problems and adapt what is learned to the next situations are among the basic learning needs. Meeting children's basic learning needs makes them get ready for life psychologically, socially, emotionally and academically (Fidan & Baykul, 1994). Among these, developing numerical and operational skills is achieved in mathematics (Çiftçi, 2005).

Mathematics, an area which we need in every stage of our lives, is an important branch of science existing at the heart of life, ranging from our daily physical movements towards technology. Because mathematics is known by students as a difficult-to-learn school subject (Duru, Akgün, & Özdemir, 2005) and when this difficulty has not been overcome causes fear and anxiety in students towards the subject (Dursun & Dede, 2004; Dursun & Bindak, 2011) and causes the subject of mathematics to be perceived as a difficult-to-succeed and boring subject (Akın & Cancan, 2007). Especially in the primary first stage, the understanding of mathematics composed of abstract concepts is rather difficult for students, who at

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evaluations made in relation to students' reading the map correctly, proceeding in the correct route and the teaching of numbers was pleasing and it also provided success in the acquisitions of the lesson.

That the students showed high interest in the lesson by participating in the implementations carried out in the teaching of "Numbers" using orienteering according to the ADDIE Design Model actively and also understood and consolidated the topics is the most important result of this study. According to this result, that the learning environment in which the orienteering activity was implemented according to the the ADDIE design model in the math lesson did not only intend to transfer information, but it rather achieved the quality and permanency of the learning and teaching services by making the student active might have led to this result. However, it is possible to state that this easy-to-use ADDIE Design Model both embodies the components of other design models and is useful in mathematics.

Within the framework of the study findings, differences between the learning environment to be developed in further studies on this subject and the traditional learning environment can be examined or different learning environments can be developed in different school subjects with the teaching design model created using the orienteering activity. Moreover, learning environments making students participate actively can be developed in different topics of the subject of mathematics using the orienteering activity implemented according to the ADDIE Design Model.

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Chapter 7

THE REFLECTION OF THE VISUAL CHUNKING AND COLORING APPLICATIONS ON ELEMENTARY SCHOOL STUDENTS' GEOMETRY SUCCESS

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INTRODUCTION

Nowadays, the daily living place of mathematics has been questioned, emphasized, and therefore related findings are adopted to current mathematics teaching programs. Especially when abstract mathematics is considered, it is difficult for humans to observe the daily life of abstract mathematics, but the geometry is being in eyes of people for every day.

People would like to correct the fixation of irregularity in buildings such as; shapes in a home, hanging up a picture on a wall, drawing of symmetry, and skewness without knowing any idea about the geometry (names, types, and so on).

Geometry therefore is a curial for human life. However, it is interesting that not only students cannot tie geometry to their daily life but also the education of geometry is not satisfactory due to the theoretical training. For this reason, the development of people' geometric thinking skills and knowledge that are existing for the adaptation of their daily life has been came to the forefront (Bozkurt & Koc, 2012).

Besides its usability in daily life as a fundamental of mathematics learnings, geometry has functions as follows: (i) the use of as a tool for the learning other disciplines, (ii) the drawing of model for the problem solving, (iii) the use of geometric shapes for the spatial relation, (iv) the use of geometric shapes in a science education (Zhang, Ding, Stegall, & Mo, 2012). Prior to the education, students begin to interact with geometry by encountering external stimuli such as cartoons, street games, and digital games and these interactions keep on for a lifelong. In this respect, it was stated that the geometry plays a crucial role for the mathematics learning in the elementary education to reach the desired higher skills and classes (MEB, 2012). Particularly, younger age groups need more visual

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indicated that these tests were easier. Most of the students indicated that they liked visual chunking test more and this test was more understandable and that they enjoyed more with this test. Two students who have moderate success on math stated that visual chunking test was easier than that of the other students.

IMPLICATIONS

It was thought that the results of this study are the important factor in determining education practitioners' geometry problem-solving performance. In addition to this study, the effect of visual chunking on increasing the working memory capacity of students having low math achievement may be investigated in future studies. At the same time, in accordance with the results of the study, it is recommended that the examples used in the mathematic textbooks and workbooks should include visual chunking in order to facilitate students' geometry problem solving process.

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