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(SUMMARY)

MODÜLER ÖĞRETİM TASARIMININ FARKLI ÖĞRENME STİLİNE SAHİP ÖĞRENCİLERİN AKADEMİK BAŞARILARINA VE ÖĞRENME KALICILIĞINA ETKİSİNİN BELİRLENMESİ

DETERMINING THE EFFECT OF MODULAR INSTRUCTION DESIGN ON THE ACADEMIC ACHIEVEMENT AND LONG-TERM RETENTION OF STUDENTS WITH DIFFERENT LEARNING STYLES

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ABSTRACT

The focus of this study is to investigate the effects of modular instructional design on the academic achievement and long-term retention of Textile Education teachers who attend a Guidance course and whose learning styles are dependent, independent and collaborative. In the study, experimental models were used. The Subjects of the study consisted of fourth year students in the Department of Textile Education, Technical Education Faculty, who took the Guidance Courses. The Experimental group consisted of 55 students who were randomly selected. For the Experimental group, modular instruction style was used and for the Control group, expression-based (classic) instruction style was used. A Learning Style Scale, academic success test, and modular instructional design were used in this study. Two important results were obtained at the end of this study: 1. The Experimental group's academic achievement and long-term retention levels were higher than the Control group's academic achievement and long-term retention levels. 2. The academic achievement levels of students who have independent and collaborative learning styles were higher than students who have dependent learning styles. These results supported the hypothesis that modular instruction style positively affects the academic achievement and long-term retention levels of students who have different learning styles.
Key Words: Modular instructional design, learning style.

INTRODUCTION

The reflection of scientific changes and developments taking place in the field of education requires taking students to the center of teaching and individualization of teaching. In the process of education, especially the importance of the teacher and the environment prepared by the teacher plays an important role. In this context, one of the factors that affect the efficiency of the teaching process is the function of designing the teaching, which is defined as the process of deciding on the appropriate teaching method and

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environment in order to develop desired behaviors in students in relation to a certain group of students and a certain content (Doğan, 1997: 346).

There are various approaches and models providing flexibilization and individualization of teaching regarding students' characteristics by taking the students to the center. One of these design models, which is the subject of the research, is the modular instruction design that provides a flexible learning environment in its design, the active participation of students, and the opportunity for students to progress at their own rate and make their own self assessment (Gömleksiz, 2002: 421). The Module consists of teaching experiences that have a beginning and end, based on individual teaching and forming completeness in itself, arranged in a systematic frame (Fer, 2000: 21). Modules, that can be defined as a teaching unit designed for offering and gaining any skill to students, represent an extensive concept containing many components in its content, such as, "subject of teaching/learning, methods of teaching/learning, purposes of teaching/learning, required equipment, and assessment method". Prepared modules should be independent in themselves, should contain different introduction levels for students, and according to this, should be enriched by different methods, techniques and technologies, and should have summative and formative assessment mechanisms (Dochy, 1997: 9, Finch and Crunkilton, 1989: 253-254). In order to reach the learning purposes in a module providing all of these; there is an introduction, aims, required materials, explanations, forms, learning activities for students with different learning levels, and assessment tools (Hızal, 1983: 15, Külahçı, 1995: 4).

Because the modular teaching design is wide, besides the difficulty of configuration, its limitations will reflect on the design. (Module development takes a long time and much effort, and can be costly if individual teaching will be done.). However, contrary to these limitations, the simplicity in individualization of teaching that is provided by modular instruction design and the advantage of it being appropriate for students having different learning styles plays an important role in selection of this design. In this context, as Grasha (2002:248) indicated, regarding the opinion that modular teaching is appropriate for students having both independent and collaborative learning styles, the impact of modular instruction design on the academic achievement of students having different learning styles and their long-term retention levels has been identified.

METHOD

Research Model and Working Group

In the research, the pre test, last test model was used with the experiment-control groups. In the research, as a responding variable, pre, last and reminder tests points were determined; and as an independent variable, designs (modular and expression based) were determined. In the study, the modular and expression based teaching fields were performed three times as a pre test before the experimental practice, the academic achievement test was applied to the students with dependent, independent and collaborative learning styles, the last test after the experimental practice, and the reminder test after one month. The working group of the research was composed of fourth grade students taking the Guidance and Counseling course in the Textile Department of the Faculty of Technical Training at Marmara University. The Experimental group was determined by a randomization method out of 2 branches of 55 people. In the experimental group modular teaching was applied and in the control group expression based conventional teaching was applied. The experimental and control groups were balanced in terms of sex ($X^2{}_{(1)}=.83$, $p>.05$), age ($X^2{}_{(1)}=.82$, $p>.05$), learning styles [$t_{(86)}=.41$, $p>.05$] and pre test [$t_{(86)}=.92$, $p>.05$] and it was determined that the experimental and control groups were equivalent in terms of the mentioned variables according to the obtained values.

Materials Used and Process

Grasha-Riechmann Student Learning Style's Scale: "Grasha-Riechmann Student Learning Style's Scale" developed by Grasha-Riechmann (1994) was used for the purpose of determining the learning styles of the students in the experimental and control group. 60 items on the scale assess a total of six learning styles, each with 10 items. The six learning styles on the scale are: collaborative, competitor, avoidant, participant, dependent and independent. As a result of the application of the scale to the working group, it was determined that the experimental and control groups have dependent, independent and collaborative learning styles. According to Grasha (2002:34), students with a collaborative learning style learn by sharing their ideas and abilities, students with an independent learning style prefer individual study, and students with a dependent learning style learn when it is necessary and rely on a teacher or other students for a structure they can follow and for guidance.

In the assessment of the scale, a quintet Likert with "I definitely don't agree", "I agree a little", "doubtful", "I almost agree", "I definitely agree" was used. There is no opposite ended item in the scale. The scale was translated into Turkish by Zereyak (2006) and as a result of reliability studies, Cronbach Alpha reliability values were calculated as 0.61 for dependent learning style, 0.60 for independent learning style, and 0.63 for collaborative learning style. Test-retest correlation was determined as 0.74 for dependent learning style, 0.68 for independent learning style, and 0.75 for collaborative learning style for the purpose of examining whether the scale gave consistent time-dependent measurements or not. For the research working group; the inter consistency coefficient was 0.70 for dependent learning style, 0.72 for independent learning style, and 0.71 for collaborative learning style.

Modular Instruction Design

In this study, teaching analysis was done before the modular instruction design to determine the main part of the subject to be taught. While doing the analysis; the subjects and their contents to be included in the first and second modules were determined by reviewing the guidance course books content by the researcher in order to determine the topic titles for the module. The first module comprised; types of guidance (according to the number of people, function of guidance, field of problem in which guidance is done); while the second module included; educational, vocational, and personal-psychological guidance and consultancy.

After determination of what was to be achieved regarding the module, equipment (overhead projector, source books) and activities to be used in the application to be performed in class were determined. Both modules included a sample case study, cartoons, debate questions and anecdotes and the sample cases were used in the formative assessment. The prepared models were copied onto colored printouts in order to provide a module for each student. The process of the application of the design was completed in a total of six course hours within two periods. The researcher performed the teaching as student-centered in the application stage and took on a guide role in the debate process. In the assessment of the teaching stage, finding the correct choice, matching and crossword activities in the module were performed every week for the purpose of assessment and quizzes composed of 3 open-ended questions were given to the students by the researcher at the end of the module. In assessment of the product, an academic achievement test with 25 questions prepared by the researcher was used.

Academic Achievement Test

The academic achievement test prepared regarding the types of guidance subjects of the guidance course was used as a pre test before the empirical process, a last test at the end of the empirical process, and as a reminder test after one month, with the purpose of balancing the experimental and control groups. The application of a reminder test after one month was a result of a five week period between the students' intermediate and final exams. The gains expected to be assessed in the academic achievement test were determined by considering the phases of knowledge, cognition, analysis, synthesis, evaluation and application. For testing the validity of the scope of the 20 prepared questions, the academic achievement test was edited after being checked by an expert in the field. In the edited academic achievement test there were in total 20 questions, including 8 knowledge, 6 cognition, 2 analysis, 3 application, and 1 evaluation levels. The KR20 value which shows the inter consistency coefficient of points taken from the 20-question academic achievement test was determined as 0.70.

Analysis of Data

The points of the academic achievement test and the reminder test were taken as responding variables; designs (modular and expression based) were taken as independent variables in all hypotheses of this research.

A Kolmogorov-Simirnov test was carried out in order to determine the conformance of data in the pre test, last test and reminder tests conducted in the process and at the end of the research process with normal distribution. With the findings, it was determined that both distributions were within the normal distribution curve ($Z_{(pretest)}=1.19$, $Z_{(lasttest)}=0.08$, $Z_{(reminder\ test)}=1.23$, $p>0.05$). All hypotheses of the research were tested at 0.05 relevance level.

In order to test the first and second hypotheses of the research, the following were used; an independent samples t-test in third and fourth hypotheses; a paired samples t-test in the fifth and sixth hypotheses; analysis of variance in the seventh and eighth hypotheses of the research; and a two factor ANOVA was used. One factor ANOVA was done for determining from which variables the relevance of two factor ANOVA resulted, and a Scheffe test was used as a pos-thoct test. H_1 hypothesis was accepted if it was lower than $p < 0.05$; otherwise it was rejected.

FINDINGS

As a result of testing the first hypothesis (that there is a significant difference between the last tests' average points of students taking expression based and modular teaching) and the second hypothesis (that there is a significant difference between the reminder tests' average points of students taking expression based and modular teaching), it was determined that there is a significant difference between the average points of the last test [$t=2.68_{(86)}$, $p<0.05$] and the reminder test [$t=4.40_{(86)}$, $p<0.05$] of students who took expression based and modular teaching. According to this difference; the last test's average points of students in the experimental group (55.80), is higher than the average of control group (51.08). Similarly; reminder test average points of students in experiment group (64.2) is higher than the average points of the control group (56.4). These findings may be commented upon as signifying that the modular teaching design is more effective than expression based teaching in increasing academic achievement and providing long-term retention levels.

As a result of testing the third hypothesis (that there is a significant difference between pre-and last test average points) and the fourth hypothesis (that there is a significant difference between the last- and reminder test average points), it was determined that there is a significant difference between the average points of the pre-last test [$t=14.30(43)$, $p<0.05$] and the last-reminder test [$t=6.52(43)$, $p<0.05$] of students who took modular teaching. According to this difference; while the average points of the academic achievement test before application to the students in the experimental group were 28.75, after modular teaching it rose to 55.80. While the last test average points of students in the fourth hypothesis was 55.80, it increased to 64.20 in the reminder test. The increase of the average to 64.20 could be because of the short period (4 weeks) between intermediate and final exams, therefore students could have remembered the questions.

As a result of testing the fifth hypothesis (that the academic achievement of students taking modular teaching shows a significant difference according to their learning styles) and sixth hypothesis (that continuance of learning of students taking modular teaching does not show a significant difference according to their learning styles); it was determined that the academic achievement of students who took modular teaching differ according to their learning styles [$F(2-41)=47.55$, $p<0.05$]. On the other hand, there is no difference between long-term retention levels and their learning styles [$F(2-41)=1.24$, $p>0.05$]. With these findings we learn that the achievement of students who have dependent learning styles (average=45.71), is lower than the achievement of students who have independent (average=61) and collaborative (average=60) learning styles.

As a result of testing the seventh hypothesis (that the academic achievement of students shows a significant difference depending on the common effect of applied designs and learning styles) and eighth hypothesis (that the long-term retention levels of students show a significant difference depending on the common effect of applied designs and learning styles); it was determined that the common effect of style-design on the average points of the academic achievement tests of students and average points of reminder tests were not significant.

CONCLUSION AND SUGGESTIONS

Conclusions

Results achieved regarding the research can be summarized as follows:

1. It is concluded that modular teaching design has more impact than expression-based teaching on increasing students' success and long-term retention levels.
2. It is concluded that modular teaching design has an impact on increasing the success of students and long-term retention levels.
3. It is apparent that modular teaching design increases the academic success of students with all learning styles, but the highest increase is in the academic success of students with an independent and collaborative learning style.
4. It is concluded that modular teaching design is not an important factor on long-term retention levels of students with different learning styles.

5. It is concluded that the academic success of all students and their long-term retention levels do not differ from each other depending on the common effect of applied designs and learning styles.

Suggestions

Starting from the results obtained from the research findings; it was determined that modular teaching design increases the academic success of students with different learning styles when compared to expression-based teaching design and it is an important factor in continuance of learning. In this context, the configuration of modular teaching designs succeeds with appropriate activities for different learning styles. Starting from this general suggestion; the following may be proposed for researchers and applicators:

Suggestions for Applicators

1. Preparation of activities that appeal to different learning styles in modular teaching styles, taking long-term retention levels as a variable besides academic success in the assessment of the design, are suggested because it was determined that the continuance of learning after application has not been reviewed much in the light of accessible research, and therefore, there is a difficulty in achieving results that could support the findings of known research.
2. Analysis of the effect of different teaching designs on the academic success of students with different learning styles, long-term retention levels, motivation, and change of attitude towards the course, etc. is suggested.
3. It was determined that the modules prepared regarding the two subjects of the “Guidance” course with the purpose of testing the hypotheses of this research had a positive impact on students’ academic success. In this framework, preparation of modules that can applied individually or with a group and that include activities appealing to different learning styles, is suggested.
4. Following the findings of the research, it is concluded that students with dependent learning style have lower academic success when compared to students with independent and collaborative learning styles in modular teaching design. Starting from this finding, it can be suggested to applicators to reconfigure and apply research to determine the causes of the failure of students with dependent learning style in modular teaching design.

Suggestions for Researchers

1. Similar researches could be done in teaching formation lessons that take place in the first, second, third and fourth years of universities.

2. The effect on learning styles could be reviewed by creating technology-based/supported learning environments in modular teaching design.
3. Whether the application of modular teaching designs changes the learning styles of students could be analyzed.
4. The effect of using concept cartoons in modular teaching design on students' opinions could be analyzed.

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