Structural Analysis of Graduate Theses Conducted with Flipped Classroom Model Between 2014-2022

2014-2022 Yılları Arasında Ters Yüz Sınıf Modeli ile Yapılmış Lisansüstü Tezlerin Yapısal Olarak İncelenmesi

Structural Analysis of Graduate Theses Conducted with Flipped Classroom Model Between 2014-2022

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Bu çalışmanın amacı, ters yüz sınıf modeli ile ilgili yapılan lisansüstü tezlerin yapısal olarak incelenmesidir. Araştırmada doküman analizi yöntemi kullanılmış olup "Ters Yüz Edilmiş Sınıf" ve "Flipped Classroom" anahtar kelimelerini içeren Yükseköğretim Kurumu (YÖK)'nun Ulusal Tez Merkezi web sayfasında yayınlanmış olan 181 tez, yayın yılı, çalışma grubu ve sayısı, araştırma yöntemleri, araştırma modelleri, bağımlı değişkenleri, veri analiz yöntemleri ve veri toplama araçları açısından incelenmiştir. Çalışma sonucuna göre son 2 yıldır ters yüz sınıf modeli ile ilgili yapılan araştırmaların azaldığı görülmektedir. Ters yüz sınıf modeli ile ilgili yapılan tezlerin çalışma grubu incelendiğinde ise çoğunlukla lisans öğrencileri ile çalışıldığı belirlenmiştir. Çalışmalarda araştırma yöntemi olarak daha çok karma yöntemin kullanıldığı görülmüştür. Araştırma modeli olarak ise açıklayıcı karma modelinden faydalanılmıştır. Tezlerde en çok kullanılan bağımlı değişkenin akademik başarı olduğu görülmüştür. Tezlerde en çok kullanılan veri toplama aracının ise akademik başarı testi olduğu sonucuna ulaşılmıştır. Kullanılan nicel veri analiz yöntemi açısından incelediğimizde ise en çok ilişkisiz örneklemler t testinin kullanıldığı belirlenmiştir.

Anahtar Sözcükler: *Ters yüz sınıf modeli (TYS), tez, başarı*

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Abstract

This study aims to structurally examine graduate theses related to the flipped classroom model. The research employs a document analysis method, reviewing 181 theses published on the Higher Education Council (YÖK) National Thesis Center website that include the keywords "Flipped Classroom" and "Inverted Classroom." These theses were analyzed in terms of publication year, study group and size, research methods, research models, dependent variables, data analysis methods, and data collection tools. According to the study's findings, research on the flipped classroom model has decreased over the past two years. When examining the study groups of the theses, it was found that the majority were conducted with undergraduate students. The research method most commonly used in these studies is the mixed method. As for the research model, the explanatory mixed model has been utilized. The most frequently used dependent variable in the theses is academic achievement, and the most commonly used data collection tool is the academic achievement test. In terms of the quantitative data analysis method used the independent samples t-test was found to be the most frequently applied.

Keywords: *Flipped Classroom (FC), Thesis, Achievement*

INTRODUCTION

In today's world, where technology is rapidly advancing, many innovations are being incorporated into human life. It can be said that these innovations, which are effective in every aspect of our daily lives, have particularly impacted our educational experiences (Tufançlı, 2021). The rapid developments in technology have also been reflected educational environments, where modern approaches that center on learners have started to emerge over traditional methods where students were passive (Bolat, 2016). The reflection of technology in educational environments began with the use of computers in education, and this journey has evolved into what we now recognize as flipped learning (Ünsal, 2018).

The foundations of the flipped classroom model are based on the constructivist learning approach. In the FCM model, self-regulation is under the student's control, and they engage in learning by structuring knowledge (Kara, 2016). Flipped learning is generally defined as a strategy that moves the knowledge transfer process of a face-to-face class outside of the classroom, effectively reversing the educational environment (Divjak et al., 2022). Unlike traditional methods, the FCM changes the time and place of in-class lectures and out-of-class assignments (Bergmann & Sams, 2012). In environments where the FCM is used, learning occurs independently of time and place, with lectures and assignments swapping roles (Turan & Göktaş, 2015). The Flipped Learning Network (2014) defines flipped learning as a dynamic, interactive pedagogical approach where the learning environment shifts to individual learning and the educator guides students impressively while they learn concepts. The FCM model consists of two parts: group work involving collaborative efforts within the classroom and individual learning supported by computer assistance outside the classroom (Bishop & Verleger, 2013). This definition is schematically shown in Figure 1 below:
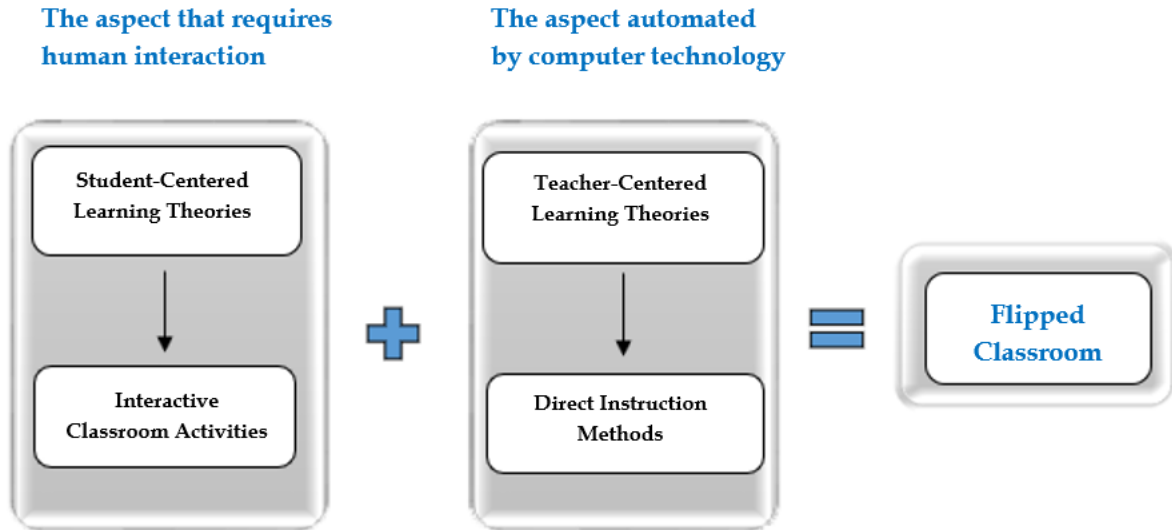
Figure 1. Flipped Classroom Model (Bishop & Verleger, 2013)

When examining the history of the FCM, it is seen that its origins date back approximately 25-30 years. One of the earliest observed examples in the field is the "Peer Instruction" method introduced by Physics Professor Eric Mazur in the 1990s, which involves learning fundamental concepts at home and completing assignments at school (Talbert, 2017). The concept of the "Classroom Flip" was first introduced by Baker in 2000. Around the same time, Lage et al. (2000) developed the "Inverted Classroom" application (Çevikbaş, 2018).

Literature Review

When the literature is reviewed, it is seen that the FCM has been referred to by different names since its inception. It is understood that the flipped classroom model is known by various names in studies conducted both domestically and internationally (Tufançlı, 2021). In foreign studies, terms such as "flipped classroom" (Bergman & Sams, 2012; Hertz, 2012) and "inverted classroom" (Lage et al., 2000) are encountered, while in Turkish studies, this concept is referred to as "dönüştürülmüş sınıf" (Yıldız et al., 2017) and "ters yüz edilmiş sınıf" (Bolat, 2016).

In the FCM, students come to class prepared by using videos, lecture presentations, and multimedia tools before attending the class, and they have the opportunity to reinforce what they have learned through in-class activities (Aşıksoy & Özdamlı, 2016). Implementing the FCM requires better planning and careful monitoring of activities conducted both inside and outside the classroom compared to the traditional model (Bergman & Sams, 2012).

The FCM offers many advantages due to its distinct characteristics compared to traditional teaching methods (Özler, 2020). Fulton (2012) notes that in the FCM, students can proceed at their own pace and teachers can gain more insight into their students and easily update the content. Students can undertake individual learning (Ayçiçek, 2018). They participate in the learning process, take responsibility for their learning, and develop self-regulation skills (Reeve, 2009). The time spent in class is more productive for both teachers and students (Brown, 2012). As students come prepared with the topics, higher-level learning opportunities are provided in the classroom (Filiz & Kurt, 2015). The interaction between teachers and students increases with the FCM (Stone, 2012).

When examining studies conducted abroad on the FCM, Divjak et al. (2022) used a systematic review method to analyze 205 studies covering online FCM approaches in higher education during the pandemic. This study generally includes key findings on the success of online FCM applications during the pandemic and recommendations for future studies. The study concludes that those who used the FCM in face-to-face or blended learning environments were more successful in applying FCM approaches online compared to those who had never used it before. Wright and Park (2022) examined 30 experimental studies involving the use of the FCM. The study investigated the impact of the FCM on K-16 students' success in science and mathematics courses. The results indicate that FCM applications have a positive effect on students' success in science and mathematics courses.

When examining studies conducted in Turkey on the FCM, Ceylan and Hamzaoğlu (2022) used a survey method to analyze 25 theses that applied the FCM approach in science education fields in Turkey. The results show that the use of the FCM in science education has become more widespread in the past two years. The FCM is observed to have a positive effect on students' academic performance. Karagöl and Esen (2019) conducted a meta-analysis to examine the effect of the flipped learning approach on academic achievement. They analyzed 55 studies from various databases according to predetermined criteria. The results show that the FCM has a positive effect on students' success. Kaya (2018) analyzed the impact of the FCM on middle school students' participation in mathematics courses in an experimental study. The results indicate that the FCM positively affects students' participation in mathematics courses on cognitive, affective, and behavioral dimensions. It is emphasized that the effect of the FCM on participation in mathematics courses should also be examined at different educational levels. The results obtained from studies on the FCM indicate that the model has positive effects on success. When examining earlier studies on the FCM, it is seen that theses from specific years have been analyzed. The purpose of this study is to examine all theses related to the FCM in Turkey using document analysis based on the specified variables. In this context, the following sub-problems are addressed:

- What is the distribution of theses written about the FCM by year?
- What is the distribution of theses written about the FCM by study groups?
- What is the distribution of theses written about the FCM by the research method used?
- What is the distribution of theses written about the FCM by the research model used?
- What is the distribution of theses written about the FCM by the dependent variable investigated?
- What is the distribution of theses written about the FCM by the independent variable investigated?
- What is the distribution of theses written about the FCM by the type of quantitative data analysis used?
- What is the distribution of theses written about the FCM by data collection tools used?

RESEARCH METHODOLOGY

Research Design

This study was designed as a descriptive study, and document analysis was utilized in the data analysis section. Document analysis is a qualitative analysis method used to examine the content of paper-based data in detail and systematically (Wach, 2013). It involves a thorough examination and evaluation of all data in written and digital formats (Kıral, 2020).

Population and Sample

The population of this study consists of all theses published on the Flipped Classroom model available on the Higher Education Council (YÖK) Thesis Center website. A total of 181 theses were accessed for

this study. All of these theses were published, and the necessary information was obtained from these published theses.

Data Collection and Analysis

In this study, the data were collected from the theses available on the Higher Education Council Thesis Center website without a year limitation (https://tez.yok.gov.tr/UlusalTezMerkezi). Data were collected from both Turkish and English theses. The keywords "Flipped Classroom," "Inverted Classroom," and "Flipped Classroom" were used in this study.

The collected data were analyzed using the descriptive analysis method. A form was created on Google Forms for 181 studies, and the theses were examined under eight headings: publication year, study group, method, method type, dependent variables, independent variables, analysis type, and data collection tools. The data were then transferred to Excel for analysis. Subsequently, the data were presented descriptively in graphs and frequency tables.

Findings

In this study, all theses related to the Flipped Classroom topic published on the Higher Education Council Thesis Center website were examined. The numerical expression of the theses examined in the study years is shown in Figure 2.
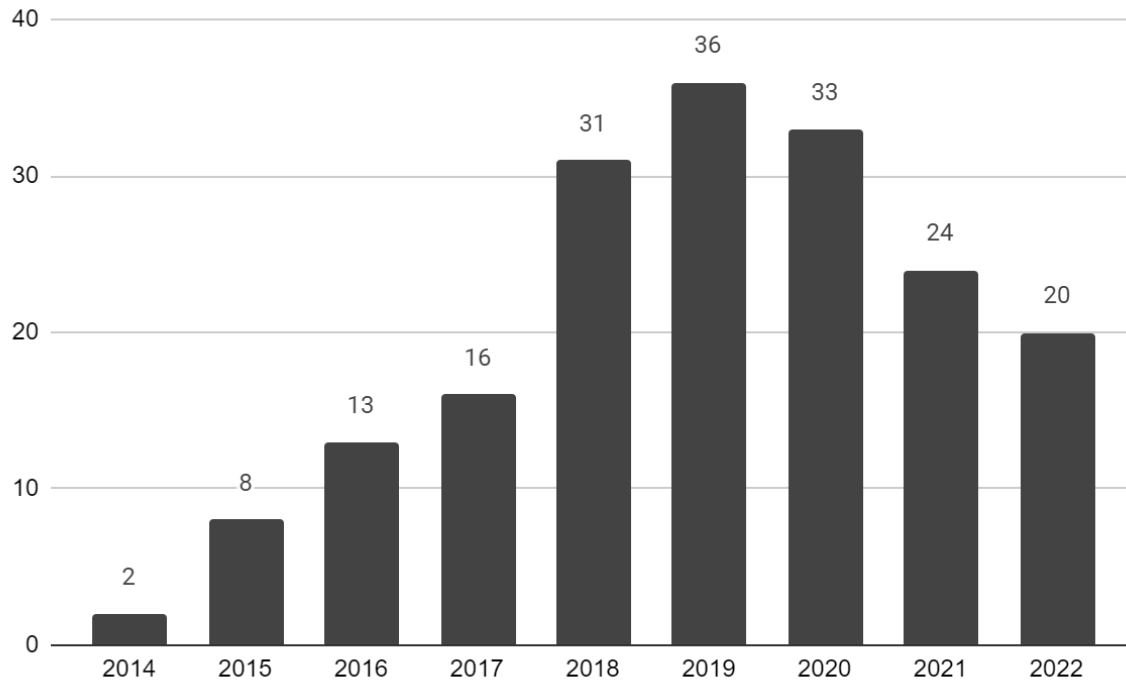

Figure 2. Numerical change of theses related to the flipped classroom model over the years

In this study, all theses related to the flipped classroom model have been examined. According to Figure 2, there were 2 theses in 2014, 8 in 2015, 13 in 2016, 16 in 2017, 31 in 2018, 36 in 2019, 33 in 2020, 24 in 2021, and 20 in 2022. Based on this data, the number of theses steadily increased from 2014 to 2019. Additionally, in 2018, the number of theses almost doubled compared to 2017. However, after 2020, the number of theses started to decrease. This can be attributed to the global Covid-19 pandemic, which led to approximately two years of remote education worldwide.

The numerical distribution of theses based on study groups within the research is shown in Figure 3.
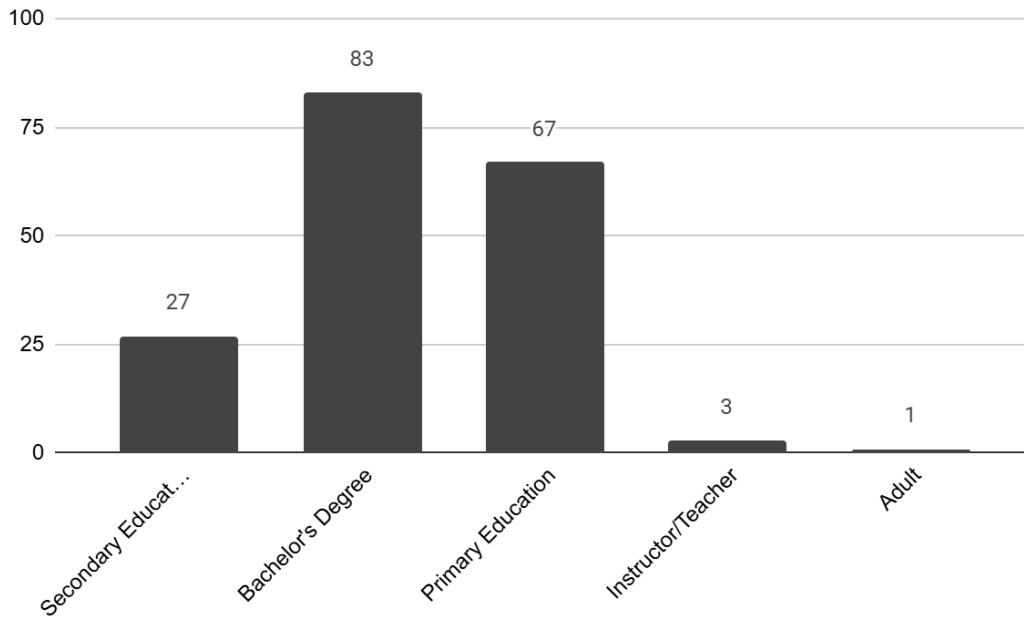
Figure 3. Numerical Distribution of Examined Theses by Study Groups

When examining Figure 3, it can be seen that there were 28 theses at the secondary education level, 83 at the undergraduate level, 67 at the primary education level, 3 related to instructors, and 1 at the adult education level. According to the examined theses, the most studies were conducted at the undergraduate level. The number of studies at the primary education level is more than twice that of the studies at the secondary education level.

In the theses related to the flipped classroom model that we examined, the research methods used were categorized into three main types: quantitative, qualitative, and mixed methods. The distribution of research methods used in the studies is shown in Figure 4.
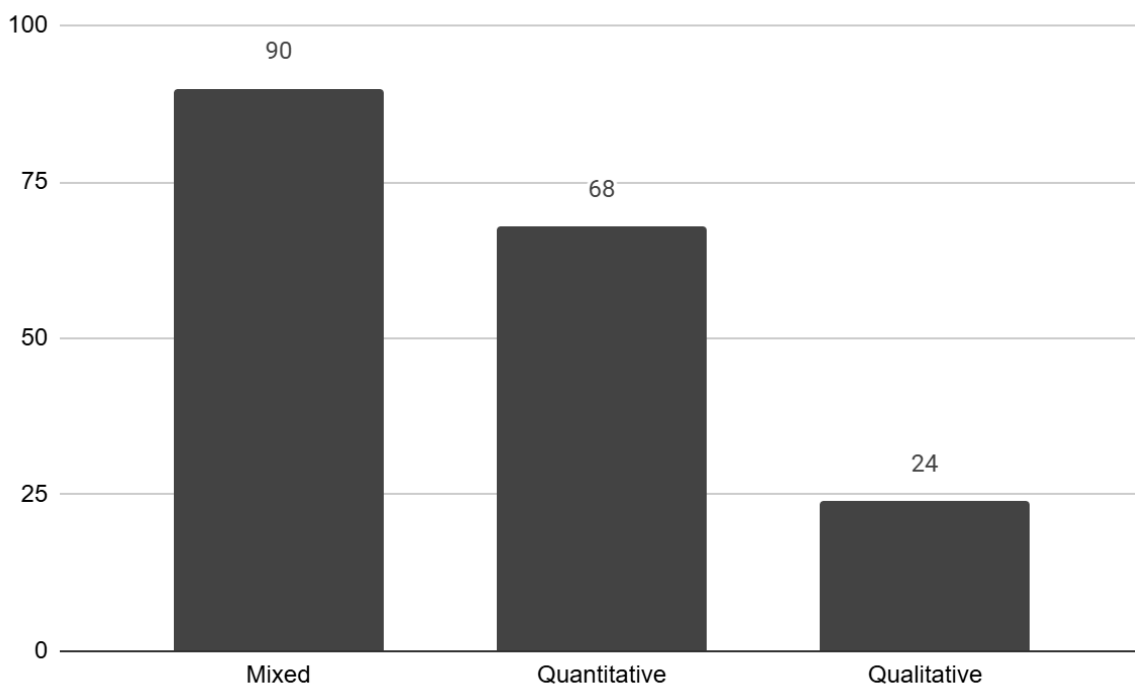

Figure 4. Distribution of Research Methods Used in Theses

In the scope of the study, when the examined theses were analyzed according to the research methods used, it was observed that mixed methods were predominantly used in the theses related to the flipped classroom model. The number of theses written using mixed methods is 90. The number of theses using quantitative methods is 68, and the number of theses using qualitative methods is 24. Although the number of theses using quantitative methods is lower than those using mixed methods, it is seen that they are relatively more numerous.

Information regarding the research models in the theses related to the flipped classroom model that were examined is presented in Figure 5.
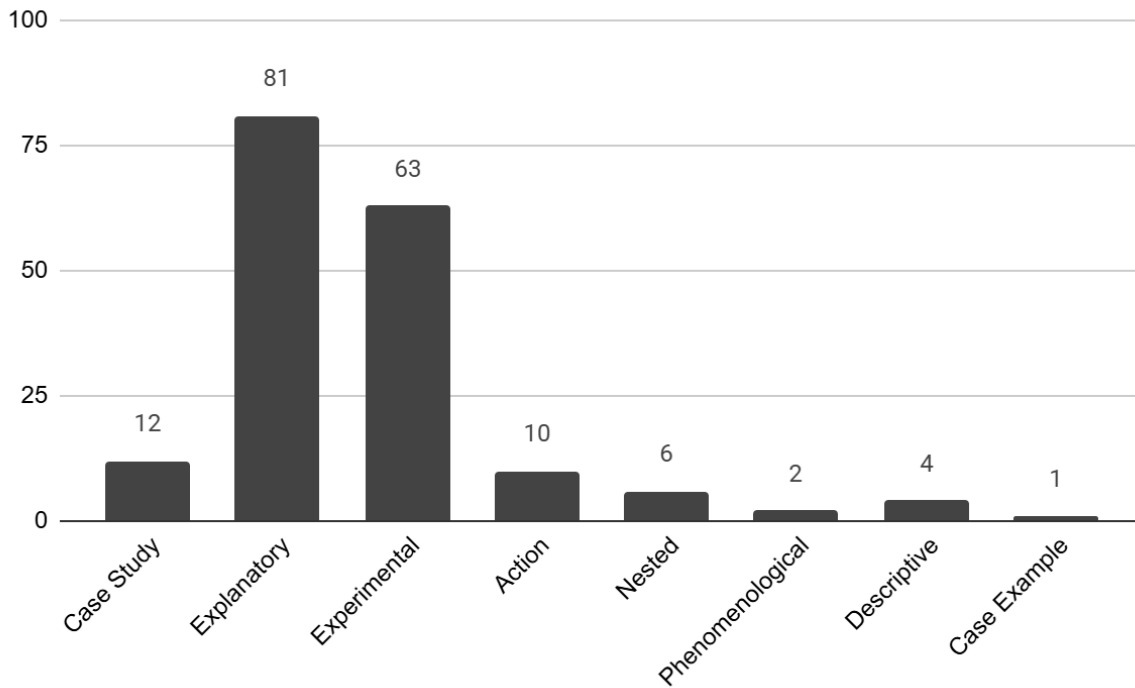

Figure 5. Distribution of Research Models Used in Theses by Research Methods

Figure 5 shows that qualitative and quantitative designs are predominantly used in theses. According to the figure, the most commonly used design is the explanatory model, which is used in 81 studies. The experimental design is used in 63 studies and ranks second. Other designs are also used but in significantly fewer numbers compared to the explanatory and experimental designs. Numeric data regarding the dependent variables investigated in the theses related to the flipped classroom model are presented in Figure 6.
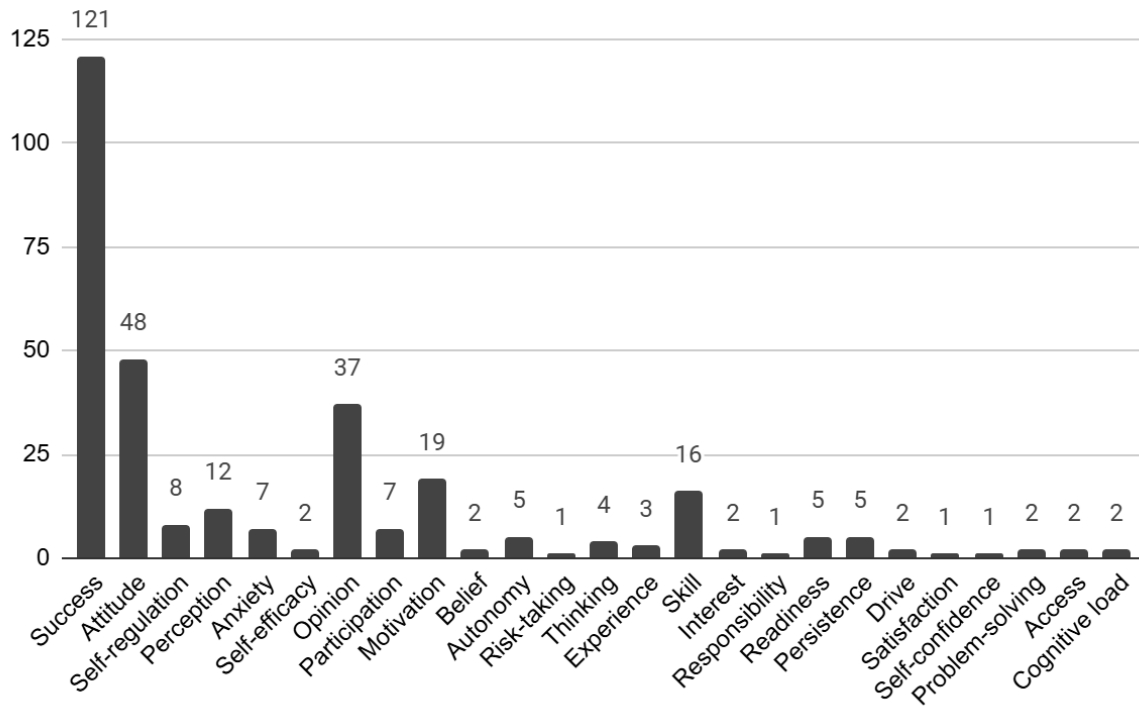
Figure 6. Distribution of Dependent Variables Examined in Theses

Figure 6 reveals that a multitude of dependent variables have been studied in theses. The most studied dependent variable in the thesis is the achievement variable, which has been used in 121 studies. Following the achievement variable, attitude is examined in 48 studies, perception in 37 studies, motivation in 19 studies, skill in 16 studies, and perception in 12 studies. It is observed that other variables have been studied in fewer theses. According to the data we have examined, numerical data regarding the types of quantitative data analysis used in theses are shown in Figure 7.
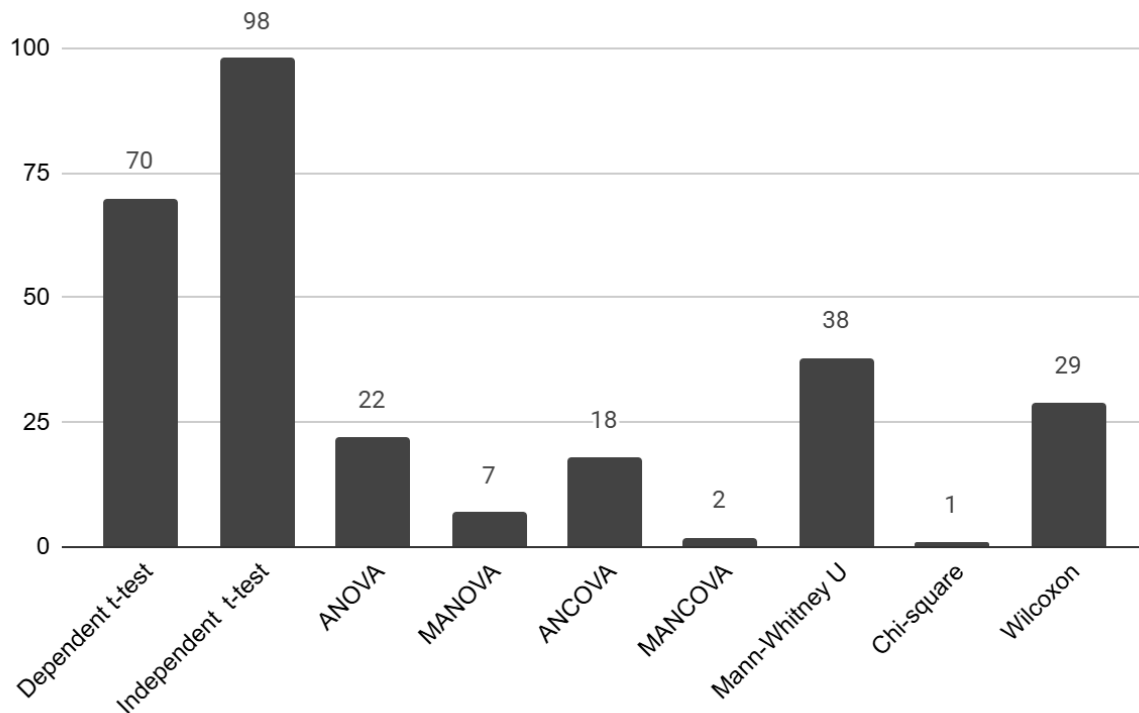

Figure 7. Distribution of quantitative data analysis types used in theses.

According to Figure 7, the most commonly used type of quantitative data analysis in theses is the independent samples t-test, used in 98 theses. The second most commonly used analysis type in theses is the paired samples t-test, used in 70 theses. Other quantitative data analysis types based on the number of uses in theses are Mann-Whitney U with 38, Wilcoxon with 29, Anova with 22, Ancova with 18, Manova with 7, Mancova with 2, and Chi-square with 1.

When examining the theses researching the flipped classroom model, the last aspect we looked at was the data collection tools. It is observed that one or more data collection tools were utilized in the examined theses. The obtained data is presented in Figure 8.
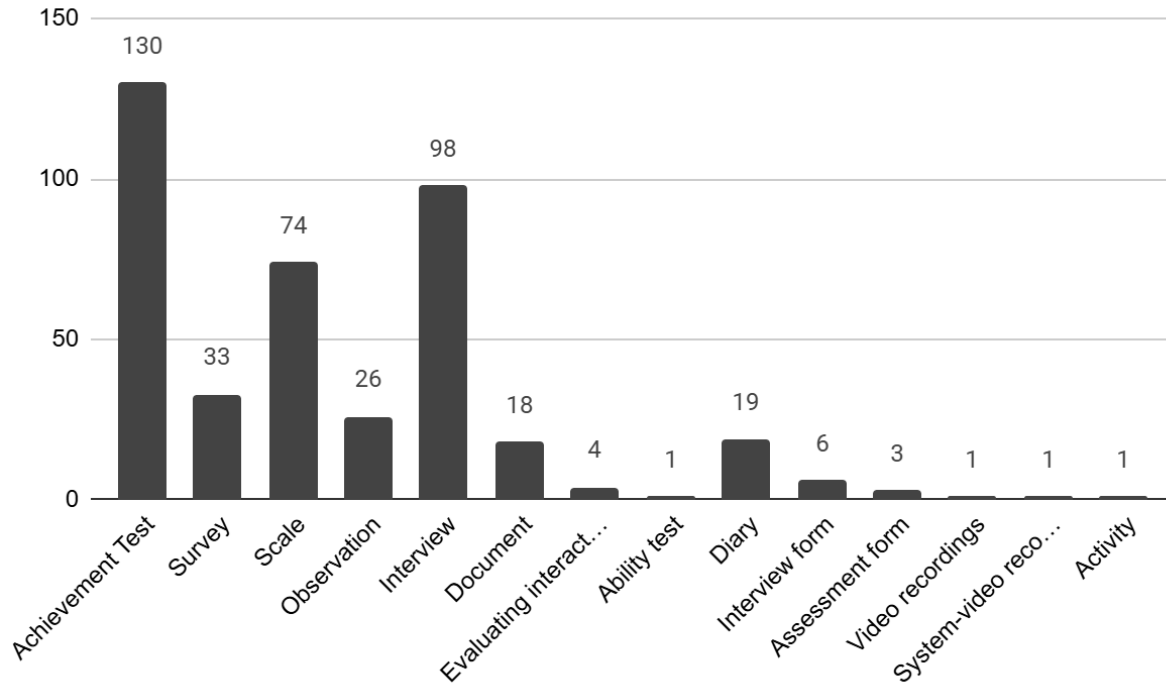

Figure 8. Distribution of Data Collection Tools Used in Theses

When we examine Figure 8, it is seen that the most frequently used data collection tools are success tests in 139 theses, interviews in 98 theses, scales in 74 theses, surveys in 33 theses, observations in 26 theses, diaries in 19 theses, and documents in 18 theses. It has been determined that other data collection tools are used less frequently in terms of numbers. According to these findings, it can be said that the most commonly used data collection tool is the success test.

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

This study evaluated a total of 181 theses related to the FCM model available on the Higher Education Council Thesis Center website using document analysis methods from the past to the present. Through document analysis, information regarding the publication year of the theses, study groups, methods, method types, dependent variables, independent variables, type of quantitative data analysis, and data collection tools were extracted.

When examining the numbers of theses related to the flipped classroom model by publication years, it is observed that the number of theses increased until 2019 and then decreased from 2020 onwards. This decrease could be attributed to the global COVID-19 pandemic, which led to a shift to remote education for approximately two years, possibly resulting in reduced interest in the FCM model during this period. This study analyzed a total of 181 related to the flipped classroom model from the Higher Education Council Thesis Center website, using a document analysis method from the past to the

present. Through document analysis, information regarding the publication year of the theses, study groups, methods, method types, dependent variables, independent variables, type of quantitative data analysis, and data collection tools were extracted.

When examining the theses related to the flipped classroom model, it is understood that the majority of the studies are at the undergraduate level. Demirer and Aydın (2017) and Tufançlı (2021) also reached similar conclusions in their studies. When we examined the research methods used in the theses related to the flipped classroom model, it was observed that the mixed method is mostly used. The mixed method combines quantitative and qualitative methods, allowing for a better understanding of the research problem and questions (Creswell, 2013). Therefore, it can be said that the mixed method is more beneficially used. When the theses are examined in terms of method type, it is seen that the most used design is the explanatory design. In addition to the explanatory design, the experimental design is also quite high in number and ranks second after the explanatory design.

In the theses related to the flipped classroom model, the most used research model is the mixed model. The reason for this is that in the mixed model, quantitative methods are supported by qualitative methods to obtain more detailed results (Sarıca & Özbay, 2019).

It is determined that the most examined dependent variable in the theses related to the flipped classroom model is the success variable, followed by the attitude and opinion variables. This could be attributed to the goal of determining whether the use of the flipped classroom model contributes to students and understanding its effectiveness. It is believed that the use of the flipped classroom model will lead to higher-level learning and increased success among students, as well as the development of a positive attitude towards the course (Balıkçı, 2015).

In the theses related to the flipped classroom model, it is determined that the most utilized data collection tool is the success test, followed by interviews. The reason for this is the use of mixed methods in the theses, with success tests used for collecting quantitative data and interviews used for collecting qualitative data. When examining the types of quantitative data analysis used in the theses, it is observed that the most used analysis type is the unrelated samples t-test, followed by the related samples t-test. This can be attributed to the use of experimental designs in the analysis of quantitative data, and the use of unrelated and related samples t-tests for intra-group and inter-group comparisons.

The data examined in this study were collected from the Higher Education Council Thesis Center (https://tez.yok.gov.tr/UlusalTezMerkezi) website. In future studies, the scope of the study can be expanded by utilizing different databases. From the examined data, it is seen that the number of theses about the flipped classroom model decreased after 2019. This decrease could be investigated in about the rapid development of technology. When analyzing the data obtained in this study, it is observed that the use of the flipped learning model generally improves students' achievements and contributes to developing a positive attitude towards the course. Therefore, it is recommended to promote the use of the FCM in educational institutions and increase the number of scientific studies conducted. In this context, future studies could involve more in-depth research such as systematic reviews or meta-analyses.

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