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THE EFFECTS OF SELF-REGULATION SKILLS ON STUDENTS' INTERACTION
AND SUCCESS IN FLIPPED CLASSROOM

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ABSTRACT

The flipped classroom is accepted in higher education as an alternative to traditional classroom methods. The data were collected from this study as follows. There are 80 participants from Psychological Counseling and Guidance students at Yeditepe University who took the course 20% men (n =16) and 80% women (n=64) in the 2018-2019 academic year. There are three sections per week and each section lasts in 80 minutes. The participants were given 8 assignments to complete after watching each video in the collection. Assignments were uploaded to the Moodle system by the participating students within the deadline. At the end of the 7-week course, a 40-question test consisting of information on video and other materials was conducted to evaluate the students' learning in this process. The analysis revealed the relationship between the video analytical data obtained from the MOOC platform where students learned and their self-regulation skills. The results show that there is no significant difference between students with high self-regulation skills and students with low self-regulation skills in terms of video interaction, Moodle interaction and course success.

Keywords: *Self-Regulation, LMS, Moodle, Flipped Classroom, Traditional Classroom, Learning Styles.*

ÖZET

Ters yüz edilmiş sınıf, geleneksel sınıf yöntemlerine alternatif olarak yükseköğretimde kabul görmektedir. Bu çalışmadaki veriler 2018-2019 Eğitim-Öğretim yılları arasında Yeditepe Üniversitesi Psikolojik Danışmanlık ve Rehberlik bölümünde okuyan %20 erkek (n= 16) ve %80 kadın (n=64) öğrencilerden elde edilmiştir. Çalışmanın amacı, ters-yüz edilmiş sınıflarda öz-düzenleme becerilerinin öğrenci etkileşimlerine ve başarıya olan etkisini ortaya çıkarmaktır. Bu bağlamda dersi alan haftada üç bölüm vardır ve her bölüm 80 dk sürmektedir. Öğrencilere video izleme platformundaki her bir videoyu izledikten sonra yapmaları gereken 8 ödev verilmiştir. Ödevler, belirlenen tarihler içerisinde öğrenciler tarafından Moodle sistemine yüklenmiştir. 7 haftalık dersin sonunda öğrencilerin bu süreçteki öğrenmelerini değerlendirmek için video ve diğer materyallerle ilgili bilgilerden oluşan 40 soruluk bir test yapılmıştır. Analiz, öğrencilerin öğrendiklerini, MOOC platformundan elde edilen video analitik verileri ile öz düzenleme becerileri arasındaki ilişkiyi ortaya koymaktadır. Sonuçlar, öz düzenleme becerisi yüksek öğrenciler ile öz düzenleme becerisi düşük öğrenciler arasında video etkileşimi, Moodle etkileşimi ve ders başarısı açısından anlamlı bir fark olmadığını göstermektedir.

Anahtar Kelimeler: Öz-Düzenleme, LMS, Moodle, Ters Çevirilmiş Sınıf, Geleneksel Sınıf, Öğrenme Stilleri.

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1. INTRODUCTION

Although traditional learning model is used widely there are some limitations such as learning takes place in a teacher-centered instruction. The student does not have an active role in instruction process. So, it is necessary for the student to take part more actively to complete the learning process permanently and effectively.

In order to adopt to the current century, it is necessary to follow the developments in technology. We have observed many changes in the social and business life (Mishra & Koehler, 2006). These changes are not only limited to social and business life, but also changes in using technology in education. According to Mishra and Koehler, although some researchers believe that changes in teaching and learning methods related to education field, may lead to difficulties because of the computer literacy readiness (2006, p.1018).

In the education system, there are many models such as traditional education, distance education, flipped classroom. Teachers are the owner of the information who transfers the information to their students in traditional learning (Buzin, 2001). As Halverson and Smith stated, technology is used to engage the students in traditional schools (2009, p.49). The reason behind different learning methods such as practice and expository teaching is necessary, is traditional teaching and learning methods cannot achieve the success sufficiently (Castronova, 2002).

While traditional learning method has been used in classrooms as a common teaching method, flipped classroom method gives the students to have access in video lectures, this urges students to learn out of the classroom (Alexander, 1995; Arnold, 1998). In addition to this, when students who do not understand the content prefer to be quiet and not attend the lesson in traditional classroom, mastery learning cannot be supported. Flipped classroom is another method during the recent years. It provides improving and facilitating students'

learning achievement. It has the most beneficial lifelong learning skills such as problem-solving (Sarı & Akınoğlu, 2009).

The purposes of critical thinking, problem-solving, questioning, discovering skills are the fundamental principles in education and technology affecting learners' ability and learning achievement (Balım, 2009). In flipped classroom, students listen and watch the shared materials in online platforms such as Moodle. Screenshots and course videos are repeatedly watched from home or outside. Moodle is used as an online platform from many users. Thus, when the students come to class, they ask the teacher about the course content if they want to answer the questions or ask questions about their misunderstandings related to the parts in the material. In addition, we can conclude that active learning is supported by time saving (Stone, 2012).

Despite traditional model has face to face learning and teacher-centered learning, there are some meta-cognitive factors such as self-regulation and motivation. This concept influences how self-regulation impresses students' interaction and success in flipped classroom. While learners are using forums, watching videos, and participating in activities, they interact with each other, and it provides being collaborative person (Fung, 2004). Self-regulation is a way of self-control in long-term behavioral and emotional strategies (Bell, 2016). Self-regulation can provide learning more quickly and finding out students' curiosity (Yu, 2018).

Classroom and out-of-class tasks, pre-class and post-class activities, and integrating educational technology can increase the effectiveness of flipped classroom approach. Through these activities, students can develop cognitive thinking skills (Abeysekera & Dawson, 2015).

As a conclusion, the flipped classroom is a student-centered approach, which enables the instructors to work step by step with small groups and contribute to the higher-order thinking skills. Therefore, it is necessary to complete the deficiencies in the traditional

method (Jantakoon & Piriyasurawong, 2018). Feedback can be given to the students by evaluating them according to self-regulation skills in the literature. Even if the self-regulation skills of the students are not known, the student's success in the courses can be investigated by tracking their video interactions. We can give interventions according to students' behaviors in online learning environments.

Traditional learning approach provides limited interaction in the classroom (Debnath1, Rahman1 & Hossain3, 2014). These limitations constrain students' learning process. Nowadays, learning environments expanded through the development of educational technology. Learning is more effective with online interaction between digital media and students.

In flipped classroom, students can improve a systematic and method to study by watching videos, reading texts, taking part in online tests, etc. The flipped classroom has teacher-student cooperation. The students can learn on their own. We prepare the students to the course via course materials before the class. When they come to the classroom, the aim of the students is to learn what they do not understand or to get more detailed information (Zhai, Gu, Liu, Liang & Tsai, 2017).

In the 21st century, we need to integrate the educational approaches. We usually keep information and data in digital environments. Users can access information through digital platforms in any time. Although the use of technology has changed in education, it is not yet implemented by the majority (Schrum, Strudler, & Thomson, 2011).

We encounter difficulties in adapting to technology in education. Some educators use it very often and some educators prefer using less. In this case, it is necessary to make fundamental changes in the use of technology in education (Selwyn, 2016). It requires taking advantage of digital platforms in flipped classroom. Using digital learning environments such as Moodle helps students interactively taking part in the classroom.

In the content of flipped classroom, there is the realization of the students' individual learning and self-regulation (FLN, 2014). This provides the students improving their awareness and gives them a point of view and helps their ability to use time more efficiently. It also allows them fulfilling their homework, activities, or responsibilities that must be completed within deadline. Self-regulation strategy has an impact on students' success by considering individual differences. Self-regulation skills which are standards, motivation, monitoring and willpower affect students' interaction and success in flipped classroom. According to research analysis made by Kazanidis and colleagues (2018), Moodle interactions help students improving their interaction skills, success rate and give them the opportunity to enhance as a student.

1. Watching interactive videos increase their attraction to Moodle in flipped classrooms.
2. Successful students tend to use more video interactions in flipped classroom.
3. Successful students are more interested in Moodle interaction in flipped classroom.
4. Successful students are more liable to perform highly on video analytics and self-regulations than unsuccessful students' based on the data that was taken in flipped classroom.

1.1. Aim of The Study

The purpose of this study is to investigate how self-regulated learning strategy can affect students' interactions with course materials and students' success in a flipped classroom approach. For this purpose, we designed a quasi-experimental model. The research questions are given as below:

- Is there a significant difference between high and low self-regulated students in terms of online learning environment interactions?
- Is there a significant difference between high and low self-regulated students in terms of video watching interactions?

- Is there a significant difference in terms of course success between the students with high and low self-regulation skills?

2. REVIEW OF THE LITERATURE

2.1.Traditional Learning

In traditional learning, the students can get new knowledge and update their previously learned knowledge from their teachers. The instructor takes an active role in traditional learning. The instructor is who can concentrate on a subject enlighten and resolve the misunderstandings and problems in the learning environments (Saini et al., 2014).

Teacher's understanding of the students psychology improves the ability to interpret their questions and ideas hence helps the students which is why the success of obtaining the goals of the course is directly related with the teachers' performances. Thus, while working with text material and doing activities, learners are impacted by the instructor (Saini et al, 2014).

Teacher is more active than students in traditional learning method, so it is a teacher-centered method (Saini et al., 2014; Tularam et al., 2018). There is a one-way communication between the teachers and students because of the teachers are the one who has the knowledge (Zohrabi et al., 2012). In addition, the teachers must have effective writing and speaking skills. Another disadvantage of this method is the need of solving in-class problems in a limited classroom time (Saini et al., 2014, p.5182).

According to Pravin Kumar Bhoyar et al. (2016), assessing from a pedagogic manner, traditional learning method can be more comfortable. In other words, students' individual level, their learning outcomes and perceptions come into play on students' learning environment.

The traditional classroom which drives lectures usually requires synchronous courses. That is the advantage of traditional classroom because students learn from peers and teachers with face-to-face interaction. And then, they accept and interact with each other as a source of motivation (Black, 2002).

According to Benson (2001), teachers must have learning strategies because they choose the materials and give a chance to learner's mistakes. Although supporting learners use several learning strategies, they can decide which one to use. Freeman and Anderson (2011) stated that language teachers do not only to teach language, but also use several learning strategies for their learners. The most effective way of supporting learning is to gain experience by practicing. Therefore, facilitating learning process and supporting self-regulated learners is linked to the instructors teaching approaches themselves.

When students' ideas, projects etc. are not supported, their motivation and courage are impressed negatively (Çakıcı, 2015). There are some disadvantages of traditional classroom. In traditional learning, the teacher who produces material and use curriculum is in the role of information provider and the student has the role of receiving that information. In order to test the student's success, teachers use test methods in the traditional learning process. None the less student skills also have an impact on the students learning progress which is why the two matters must be processed together (Jaebi, 2019, May 17).

2.2.Flipped Classroom

2.2.1. History of Flipped Classroom

Jonathan Bergmann and Aaron Sams who are the pioneers of the flipped classroom and are science teachers used an instructional tool in 2007. First, Bergmann and Sams worked on this model from the perspective of how to better face-to-face course time. They exercised the flipped classroom model in schools on different grade levels. The outline of the courses was

implemented differently due to the level of proficiency such as the 4th grade English courses and the English courses in high schools.

To prevent the students from lack of knowledge for in class activities, they shared videos before the course. So, they thought students could be prepared by watching these videos. The videos are edited by the teachers who give them as homework. Students had a chance to participate the classroom after completing their homeworks.

The most basic characteristic of the flipped classroom approach is presenting the lecture on a topic and give homework regarding time and place. So, it transforms teacher-centered learning into student-centered learning.

The difference between flipped classroom and the traditional method, flipped classroom not only makes the students ready for class but also helps them to prepare and evaluate effective and interactive activities in the classroom setting (Bergmann & Sams, 2013/2014).

According to Thompson (2011), Sal Khan who is the founder of the Khan Academy, used this method as an online tutor to help his niece in her courses. He noticed that his niece enjoyed watching videos because she was able to pause, play and watch video again at any time. By influencing the idea, Khan Academy website enables online videos that have been translated into many different languages by setting up virtual classes through the ability to appeal to a wide range of audiences (Khan Academy, 2014).

2.2.2. The Four Educational Pillars of Flipped Learning

According to Hamden et al. (2013), the flexible environment, learning culture, intentional content and professional educators forms this structure as the four pillars of effective flipped learning.

In the flexible and adaptable learning environments shown in the first column, instructors enable students to question their learning goals in a higher cognitive structure, a

more flexible classroom environment, when and where students want to learn, strong options such as group or individual work, performance, and assessment (Hamden et al., 2013).

Based on Vgotsky theory, the flipped learning model is a student-centered approach from a teacher-centered classroom. It promotes students' discovery of their readiness for class and their courage through the transition to face-to-face education (1978).

The Intentional Content in the third column allows the teacher to determine what content to teach through the video in the teaching materials determined by the teacher and to research on their own. For this reason, Hamden et al. (2013) supported the use of Socratic methods in class level and subject content for active learning strategies, problem-based learning, peer education. Otherwise, if the teacher plays the leading role, no student will benefit to learn strategies.

Professional Educators which are in the last column represent their role and importance in the flipped classroom. Hamden et al. (2013) have the opinion that the primary function of the educator is to shape the individual-group teaching and to use the time in the classroom with students more effectively.

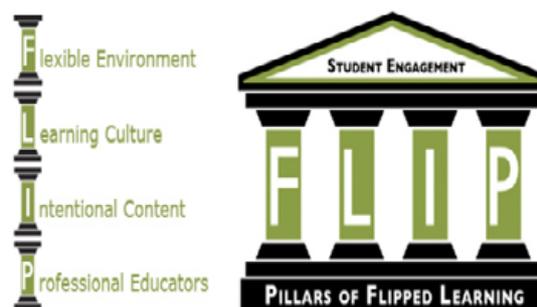


Figure 1. The four educational pillars of flipped learning

Visual depiction of The Four Educational Pillars of Flipped Learning showing support for student engagement. Copyright 2014 by the Flipped Learning Network.

2.2.3. Flipped Classroom (FC) Approach?

The flipped class model is a pedagogical approach in which we present direct learning digital sources to students in an online platform and learning occurs from group to individually (Bergmann & Sams, 2012; Network, 2014).

Cooperative learning is a learning structure based on The FC Model. This is a very active way for the student to learn both individually and contribute to group tasks (Toto & Nguyen, 2009; Crouch & Mazur, 2001). For this reason, the video lessons and interactive learning activities constitute the basic components of the flipped classroom (Bishop & Verleger, 2013).

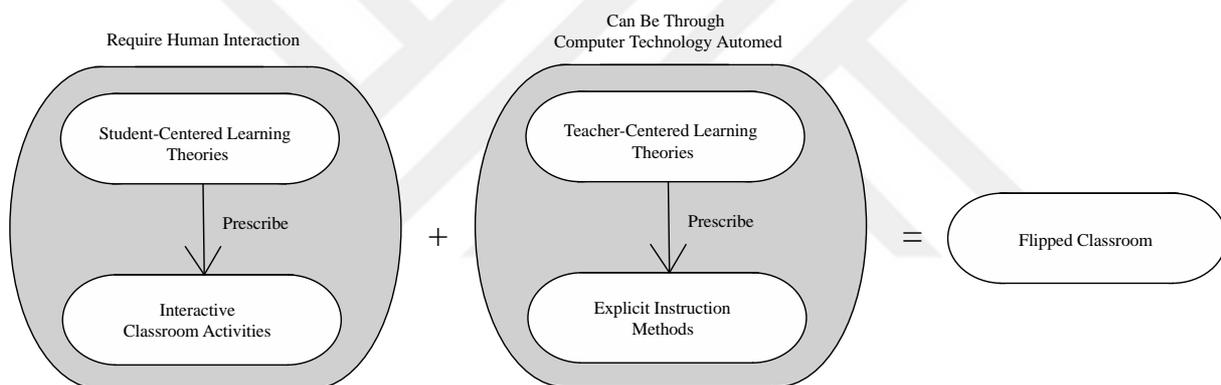


Figure 2. The Flipped Classroom definition represented by Bishop and Verleger (2013, 6)

Flipped Learning Network [FLN] (2014) has the intention of four fundamental features in Flipped Classroom. These are flexible learning environment, learning culture, international content, and professional educator.

- **Flexible Learning Environment:** Educators supporting students to satisfy their needs and expectations in a flexible way, either individually or in group work.
- **Learning Culture:** As the flipped classroom is learner-centered, the teacher provides the content to students, and they support learning by the activities.

- **Intentional Content:** Educators determine the students' needs and enhance their conceptual understanding and exploring by using active learning strategies.
- **Professional Educator:** In order to improve the students learning process the teacher gives feedback to students during class time.

The FC Model is moderated by the teacher in the classroom however the instructor can also be helpful from an outside perspective. This can help the student to have a better understanding of the material (Herreid & Schiller, 2013). The instructors who use technology for content development purposes in their courses can prepare videos for students to gain the students' attention and enable them to take part in student-centered learning actively when they use the online video materials (Herreid & Schiller, 2013).

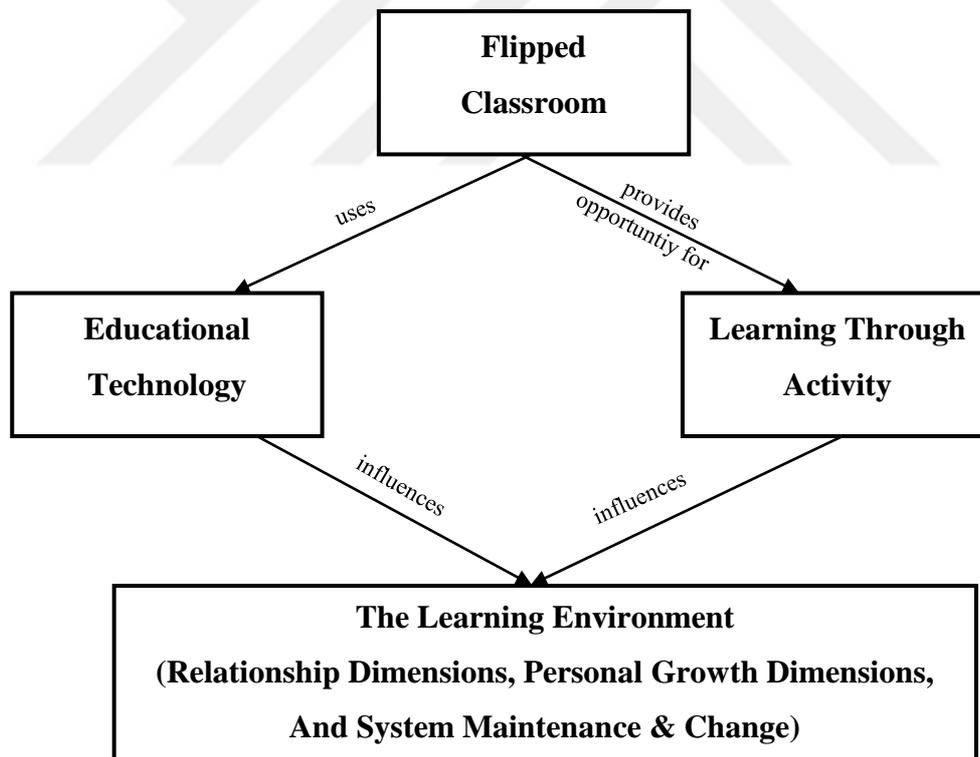


Figure 3. Strayer's (2007, 28) Theoretical Framework for Flipped Classroom

By activating student-student interaction and teacher-student interaction, it provides the students with the opportunity to self-regulate themselves and exchange of their ideas for high level of performance (Wiginton, 2013).

Not only re-arranging specific activities but also teaching curriculum in this approach is defined as a flipped classroom (Bishop & Verleger, 2013).

Bishop and Verleger (2013) stated that homeworks are part of web-based video lecture and closed-ended question are important as in-class activities.

According to Toto and Nguyen, FC allows students to work collaboratively (2009). Besides, this group work encourages students to change ideas through podcasts and videos (Milman, 2012). In addition, Khodr and Waller (2016) who investigated engineering students found that flipped learning approach contributed to learning and students' attention.

As the flipped classroom is learner-centered approach, the activities contribute more students' self-regulation, students' learning processes, students' perceptions, students' experiences, and students' achievement than the traditional learning environment (Yarbro et al., 2013; Butt, 2014; Cabi, 2018). Kim et al. (2017) stated that the flipped classroom approach is applied mostly in higher education,

Long et al. (2017) explains that when the instructors who use methods such as in class activities, students can be motivated to aim higher. They also tend to learn more efficiently in an enjoyable environment. Danker (2015) defined that students' curiosity, FC affects the student's success and thinking skills via in-class activities.

As a summary, in flipped classroom model group activities and pre-class materials are observed by the teacher. Thus, student's ability to solve problems increases as well as their cognitive and cooperative skills (Ceylaner et al., 2018; Yu, 2018).

There are multiple differences in the flipped classroom and traditional classroom implementation. First, Bormann (2014) claimed that through learning models depend on

Bloom's Taxonomy, the traditional classroom uses only three stages in low-level cognitive processes such as remembering, understanding and applying. The purpose of Bloom's Digital Taxonomy is to adapt its instructors to use technology and digital tools and transform student thinking to facilitate students' learning experiences and outcomes. According to Lightle (2011), the use of Web 2.0 tools that make students interested in digital learning opportunities and enables collaboration and innovation. In addition, Meyer (2010) stated that trainers use different materials in the learning objectives of the students. This can vary to the information based on the background of the learners.

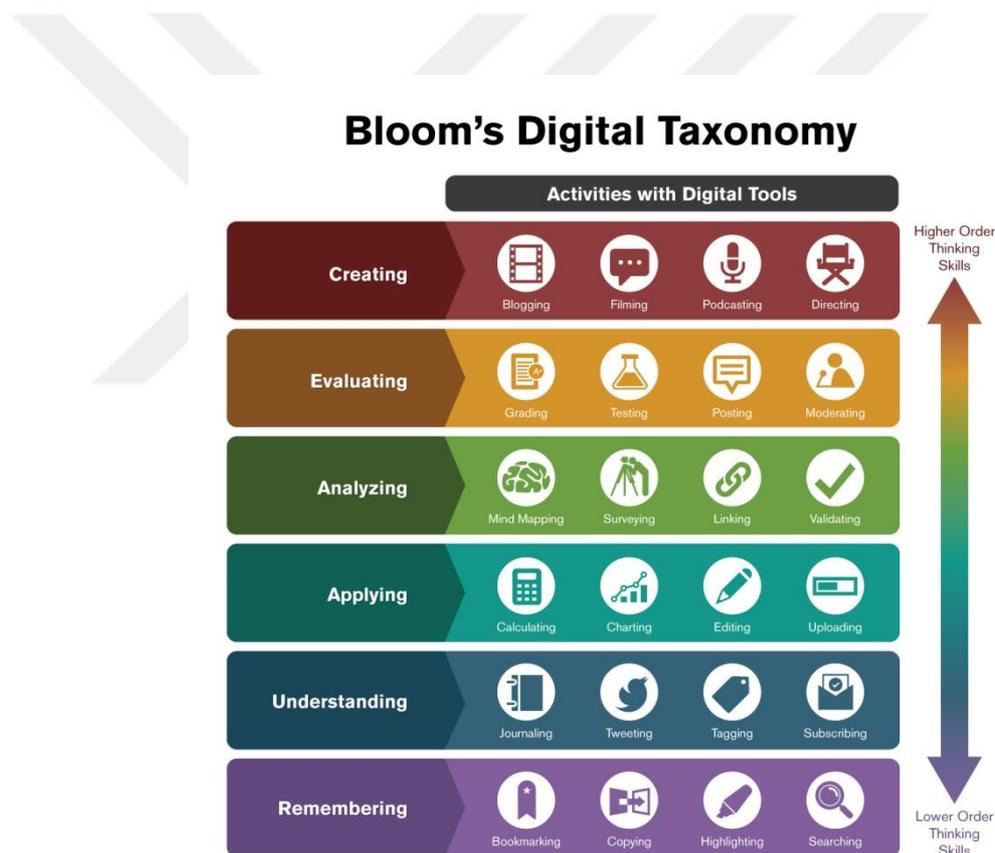


Figure 4. Bloom's Digital Taxonomy

Source: (Bloom, 1956).

According to outcome of the study, it showed an increase of success level in the flipped classroom method than the traditional classroom method. This was evaluated from the data

that was taken by the teachers who measured the students' achievements. Because of the results, this showed a rapid interest to the flipped classroom. (Schwarzenberg et al. 2017; Baepler et al., 2014).

Altering from traditional classroom can be demanding because of the requirements flipped classroom has such as multimedia-content and technological equipment (Davies et al., 2013; Leicht et al., 2012). However, changing the classroom atmosphere can be more beneficial to students in terms of student learning outcomes and their achievements (Reeve, 2013; Wilson, 2013).

On the contrary, Long and colleagues (2017) stated that active learning is affected by in-class activities and students' anxieties increased for pre-class preparation.

In their research He, Holton, Farkas and Warschauer (2016) and Liebert, Mazer, Lin, and Lau (2016) suggest after an experimental study on nursing students, result showed that there is no significant differences in course evaluation with regards to flipped learning or traditional learning.

On the other hand, Keller and Suzuki (2004) argued that the inclusion of innovative educational technologies in traditional classes may first attract students' attention but their interest decreased in time. Steen-Utheim and Foldnes (2017) also reported that students preferred active learning in the flipped classroom because learners felt more secure, their connection with their classmates improved and teachers acknowledged the students' progress when the learning environment is more dynamic.

2.2.4. Benefits of Flipped Classroom

Previous research revealed many useful aspects of the flipped classroom. By the help of pre-class homework assignments and pre-study with videos, the students can comprehend the content of lecture (McGivney-Burelle & Xue, 2013; Carney et al., 2015).

Long and colleagues (2017) described that when teachers use the flipped classroom model, they support students' learning motivation and active learning.

According to DeGrazia et al. (2012), another positive aspect of the flipped classroom was that the student's preparation to the class in while completing the assignments given before the lessons. Although students could learn more in textbooks materials, especially high school students (Sappington et al., 2002) preferred to watch videos (DeGrazia et al., 2012).

In flipped classroom approach, during class time students who had difficulties on their homework assignments can have the opportunity to ask questions to their instructors and this method gives them a chance to associate with their classmates. When they explore together, this improves their research abilities (Bergmann et al., 2013/2014).

The flipped classroom can help the students who are not present in class gives them the possibility to keep up with the assignments from the short videos. This can also be an advantage when the teacher is not present during a lecture. Therefore, it prevents students not to lack behind their courses (Bergmann et al., 2013/2014).

In the flipped classroom, the interaction between instructors and learners utilizes the students to improve their general characteristics such as communication skills, collaborative working skills (McLaughlin et al., 2014), self-regulation skills etc. (He et al., 2016; Yang, 2017).

2.2.5. Challenges of Flipped Classroom

Although there are many positive effects of the flipped classroom implementation. There are also negative sides. For example, the amount of work load given out of class may cause a decrease on the students interest to the particular subject (Missildine et al., 2013).

The flipped classroom method may not always be as effective due to fact that pre-course class preparation may put them under pressure and lead them to feel anxious during their classroom activities (Strayer, 2009). Because of this difficulty of out-of-class

preparation, teaching a lesson in-class is more satisfactory to the students (Lo et al., 2017; Seery, 2015).

Since students have been working and studying to the traditional method until this time. Therefore, they resist to change the process until they become familiar to the flipped classroom in which the new learner-centered teaching model (Chen, 2016; Simpson et al., 2015).

Milman (2012) investigated that this new learning environment regarded students as many distracting factors, such as losing themselves while watching videos which are course materials. Moreover, some researchers argued that students had some issues such as concentrating, incomprehension, and duration of performance (Enfield, 2013; Lopes & Soares, 2016b) problems in the content of lesson.

In flipped classrooms, the students need high-speed Internet and technological devices to reach these course materials. The major problem is here that some students do not have this opportunity (Missildine et al., 2013).

2.3. Self-Regulation and Self-Regulated Learning in Flipped Classroom

As students are used to learning lesson content by teachers in the classroom, students are expected to argue against the flipped classroom approach because in this approach the student has to learn the content individually. The fact that the students come to class without preparation leads to low performance (Herreid & Schiller, 2013).

Eventually, learners need to have the skills to administer and systematize their own learning and to manage their own learning. The learners may not have the skills to manage and organize their own learning, they can hinder the learning process and lead to insufficient learning. The ability of the student to regulate themselves is an essential part of the flipped classroom and therefore the student has the necessary skills for learning (Sun, 2015).

For this reason, the flipped classroom model requires the development of several skills of students to use effectively. One of these skills is self-regulation. Bandura & Kupers (1964) found that self-reinforcement practices helped students adopt this model because of a study on self-regulation theory. Self-regulation is defined as blended online learning which involves students acting (Zimmerman, 1989) in a cognitive, emotional and motivational manner (Zimmerman, 2002).

According to Schunk and Zimmerman (1998), since self-regulation of learning is not a personal trait, it is necessary to talk about the specific process to adapt to each learning task. Self-regulated learning is defined as the tendency of the person to achieve their goals and is related to motivation and success (Zimmerman & Schunk, 1989). Self-regulatory is a process in which the students are graduated from high school or college develops his / her intelligence, academic achievement, and lifelong learning skills (Zimmerman, 2002).

Self-regulated learning which is argued to be the goal-oriented process for learners is also described as observing, regulating, and controlling their own behaviors by considering, learning to learn and controlling their working, their purposes and personal characteristics (Wolters et al., 2005). Self-regulated learning strategy is related with students' success (Azevedo et al., 2004) and their mental models (Azevedo & Cromley, 2004).

Self-regulated learning strategies can benefit to student's success via individual differences (Hodges et al., 2008). Additively, as each student cannot regulate themselves, this may lead to an adequate learning process. Therefore, providing the control of learning process is the basic rule of the flipped classroom. (Sun, 2015).

The construct of self-regulated learning identifies a self-directed process that changes students' mental abilities and academic skills. In this way, self-regulated learning pioneers the learner to develop learning strategies. In addition, it should also be taken into consideration that the active role of the students in the learning process and the feedback and motivation

given to them during the process affect the students' learning (Zimmerman and Labuhn, 2012; Benbenutty et al., 2014). Socio-cognitive theory influences personally, behaviorally, and environmentally (Bandura, 1997; Zimmerman, 2002). For this reason, the observation impresses the students' general characteristics (Zimmerman, 1998).

Pintrich (2000) and Zimmerman (2001) researched SRL models. Student goals are influenced by cognitive systems and environmental effects on this type of models. Second, it allows individuals to check and conduct themselves as cognitive, motivational, behavioral, and contextual. Moreover, self-regulation makes easier individual and non-individual factors. Another factor, because of individual goals, the learning process and control are impressed by the outcome of this study. Finally, the real learning performance and personal and goal-related comprehension are affected by these models.

The point of SRL is to increase the academic achievement of students in a traditional method such as graphics, sound, video and text (Azevedo & Cromely, 2004; Zimmerman, 1990). Zimmerman (Zimmerman, 1998; Zimmerman & Campillo, 2003) and Pintrich (2000 and 2004) theories have complex structures in comparison because while Zimmerman's model comprises of 4 stages. This consist of self-control, self-regulation, self-possession, and self-reflection. These materials are cognitive, motivation, external environment and students' problem-solving abilities. In the Pintrich model, the process only consists of learning through self-regulation.

2.4.Learning Analytics

Learning analytics ensure the learning experience of collecting and explain the meaning of data by providing the interaction of learners and instructors through digital platforms and goals to develop the course. In the flipped classroom, instructors can monitor learners' learning processes and it can be used to make and implement educational decisions using with learning analytics (Van Leeuwen, 2018). When Leitner et al. (2017) examined the latest

trends in learning analytics, they predicted that in short- and long-term learning abilities can be used as a structure in higher education. Siemens and Long (2011) defined that different learning analytics steps. These are evaluation, acquisition, surveying, and reporting of student data. These help to comprehend the learning process.

Lam, Lau, and Chan (2019) ensured that in the long-term use of learning analytics can be beneficial o flipped classroom. Learning analytics show the potential of both evaluating the learning process of the student and providing feedback data for the instructor. Despite the study of Lam, Lau, and Chan (2019), Pintrich & Garcia (1994) have discovered that instant evaluation implementation depends on LMSs limit. In the learning experience of the student population, SRL theory (Pintrich & Garcia, 1994) has been used as a tool in flipped classrooms to promote self-regulation in learning and metacognition strategies because it can reveal the cognitive and behavioral abilities. In a research completed by AlJarrah, Thomas, and Shehab (2018) and Silva and colleagues (2018) learners who plan, monitor and work together show that self-regulation provides learners a better understanding of the subjects.

2.5.Video Analytics

Video analytics, especially when considering MOOC, use most videos as their primary distribution center, and according to Giannakos and colleagues (2013) it is expected that the videos will greatly influence video-based learning research. Video analytics can benefit to student understanding and improving the use of video resources, classroom components, and evaluation of activities in flipped classrooms (Garrick, 2018). With the large-scaled perform of video-based learning systems (MOOC platforms) such as Khan Academy and edX, companies that started offering these trainings (e.g., Coursera and Udacity) have made better results in the field of learning analytics. It is a method preferred by many instructors because students can study and research before class from the recording in higher education to

present video learning materials that learners can study on their own before face-to-face education by recording video activities and course contents (Giannakos et al., 2013).

Giannakos et al. (2014) argued that the videos included in the lecture contents should be evaluated to contribute the interaction and experiences of the students, regardless of whether they are used to support the course resources or as MOOC components in the flipped classrooms.

Personal reports may prevent students' behaviors from being remembered correctly, since previous studies on this subject have been evaluated on self-report results regardless of objective studies (Winne & Jamieson-Noel, 2002). Through video analysis, online platforms (Youtube etc.) and MOOC (Coursera, EdX etc.) providers play a role in revealing the contributions learners make to their learning experiences by using video watching or click stream data (Giannakos, Chorianopoulos, & Chrisochoides, 2015).

Gathering information through self-reports instructors can identify students learning outcomes and their motivation to the pedagogical requirements (Pardo et al., 2015). Using in-video quizzes (IVQ) to measure students' understanding of the course content by watching videos helps to reveal the students' situation (feedback, clarity of teaching, motivation, etc.) as well as the effectiveness of the videos in terms of learning (Giannakos et al., 2014; Mirriahi & Dawson, 2013).

It has been determined that while the students do not attend the class on time and show a tendency to watch the records of online courses later, as the time of the exam approaches, the rate of watching videos by only absent people increases (Brady, Wong, & Newton, 2013; Brotherton & Abowd, 2004).

By means of the clickstream behavior in MOOCs which aims to determine the learner characteristics that predict reveal stronger SRL skill from data (Kizilcec, Perez-Sanagustín, & Maldonado, 2017). Therefore, learning analytics and data obtained from video analytics are

needed for MOOC to function. This study was prepared in order to reveal the relationship between the monitoring data produced by students' interactions with video and learning analytics using the video lectures and the students' self-regulation skills.

3. METHOD

3.1. Purpose of the study

This study aims analyzing the effects of self-regulation skills on students' interaction and success in flipped classroom. It has a quasi-experimental model, single-case experimental design and only post-test. The study was conducted by dividing the sample into two groups as high and low self-regulation to median values according to the online self-regulation scale with the data obtained from a class experimental group randomly. Since there is no control group, post-test is applied to a single experimental group.

3.2. Research Design

Campbell & Stanley (1966) described the single-group case study as the most sensitive type of quasi-experiment against threats to internal validity. For a group of participants with dependent variables, a single group is measured by the researcher using the post-test design. The biggest limitation of this design is that, since to internal validity threats such as historical influences (unexpected events with the exam) and maturation effects (natural changes in learning). There is no comparison or control group, the design is susceptible (SAGE Pub.,2019).

The aim of this study is to investigate whether have an effect of self-regulation skills on students' interaction and success using with Moodle, video interaction and formative assessment using with the online self-regulation scale in flipped classroom. A total of 100 students participated in the scale and the data of the students were obtained as an online Google document before starting the subject lecture lessons. After the missing data (20) were removed, the data of 80 students were included in the analysis process. Confirmatory factor

analysis was used for validity test and Cronbach alpha values were calculated for internal consistency coefficients for reliability test. The necessary assumptions were tested before the analysis. The analyses were made with the 25th version of IBM SPSS Statistics program. The necessary assumptions were tested before the analysis. The results of the analysis are given in the findings section.

In accordance with the aim of the study, the 24-question Online Self-Regulation Scale, which was translated into Turkish by Kilis and Yıldırım (2018) at the beginning of the semester, was prepared and shared with the students.

The content of the information technologies course consists of topics are basic concepts of software and hardware, basics of operating system, utility programs (third party software), word processing programs, calculation / table / graphic programs, presentation programs, desktop publishing, internet usage in education and secure internet usage.

There are three sections per week from 09:00 a.m. to 15:00 p.m. Each section lasts 80 minutes. The course materials such as word documents, portable document format (pdf) and videos were shared with the students through Moodle system for 7 weeks. During this process, students were given assignments about videos uploaded every week. The duration of each of the videos was maximum 10 minutes. The students were given 8 assignments to do after watching each video in the collection. Assignments were uploaded to the Moodle system by the students within the specified dates. At the end of the 7-week course, a 40-question test consisting of information on video and other materials was conducted to evaluate the students' learning in this process. The test results were evaluated over 100 points.

3.3. Research Questions

The main purpose of this study is if there is a significant difference in the performance and interaction between students with different levels of self-regulation skills in the application of flipped classes to find the answer to the question.

The third research questions that guide the design of this research are as follows:

Question 1: Is there a significant difference between high and low self-regulated students in terms of online learning environment interactions?

Question 2: Is there a significant difference between high and low self-regulated students in terms of video watching interactions?

Question 3: Is there a significant difference in terms of course success between students with high and low self-regulation skills?

3.4.Participants

In this study, the sample criterion is used, and the evaluation is based on the relative criteria. The flipped classroom population in this study consists of students in higher education. The research was completed with data from 80 people, as 20 of the 100-person population refused to complete the online self-regulation scale. Participants who are 80 people are from Psychological Counselling and Guidance students at Yeditepe University who took the course 20% men ($n=16$) and 80% women ($n=64$) in the 2018-2019 academic year. For detailed sample description you can see in Table 1. University students do not get training information technologies before.

Table 1. Demographic Information of Participants

| | | Frequency | Percent |
|-------|-------|-----------|---------|
| Valid | Men | 16 | 20.0 |
| | Women | 64 | 80.0 |
| | Total | 80 | 100.0 |

3.5.Data Collection Tools

3.5.1. Online Self-Regulation Questionnaire

To measure students' self-regulation skills, Online Self-Regulated Learning Questionnaire (OSLQ) is improved by Lan, Bremer, Stevens and Mullen (2004) a 5-point Likert scale consisting of 86 items in online learning environments with 204 students. Then,

in 2008, Barnard, Paton and Lan reduced these items to 24 items and organized 6 sub-groups in a 5-point Likert type. The validity and reliability tests of the short form of the subscale of OSLQ were performed by collecting data from 24 students (Barnard et al., 2009). The short form of OSLQ was found to be valid and reliable according to the results of the analysis (Barnard, et al., 2009). The validity control was provided by confirmatory factor analysis and the indices were found to be agreeable. The blended consequences show evidence of construct validity for students in online learning environments. When the reliability was supported by controlling internal consistency values, the internal consistency value of the whole tool was found to be 0.93, in blended learning the Cronbach's Alpha value of the subscale between the range of .67 to .90, and, in online learning the Cronbach's Alpha value of the subscale between the range .87 to .96.

The 24 items in online self-regulation scale survey are answered by students for degree of agreement with different statements using the Likert scale 1 = “totally agree”, scale 2 = “disagree”, scale 3 = “neither agree nor disagree”, scale 4 = “agree” and scale 5 = “totally agree”. The question type, six sub-factors of self-regulation skills, are in short form.

The 24 items in online self-regulation scale consist of topics such as goal setting (GS), environment structuring (ES), task strategies (TS), time management (TM), help seeking (HS) and self-evaluation (SE). ES with 5 items, GS with 4 items, TM with 4 items, HS with 3 items, TS with 4 items and SE with 4 items are included in subscales' factors and numbers of items. Moreover, Zimmerman (1998) defined six subscales of Online Self-Regulated Learning Questionnaire (OSLQ) as below (pp.76-79):

- “Selecting or creating effective settings for learning” are occurred in ES.
- “Specifying intended actions or outcomes” are emphasized by GS.
- “Analyzing tasks and identifying specific, advantageous methods for learning” are demonstrated from TS.

- “Estimating and budgeting the use of time” are meant by TM.
- “Choosing specific models, teachers, or books to assist oneself to learn” are described on HS.
- “Setting standards and using them for self-judgment” are indicated by SE.

Uzun, Ünal and Yamaç (2013) translated the scale questions of the self-regulation scale short form into Turkish without using validity and reliability test, but this translation was not acceptable and applicable due to lack of statistical and scientific translation. Similarly, this scale was previously translated into Turkish by Yetik (2011). In the translation process, the validity and reliability of the scale was tested for compatibility with the original and the students were studied in the traditional classroom environment. While the assessment tool was designed to measure students' self-regulation skills in online learning environments, scale questions aimed to reveal skills for online learning environments. Validity and reliability study of the scale procedures were not statistically and scientifically appropriate because they were not conducted with a sample that was suitable for the purpose of the scale. Therefore, the validity and reliability tests with the shortened items of the Online Self-Regulation Questionnaire (OSLQ) were tested by Kilis and Yıldırım (2018) in parallel with the purpose of the measuring instrument and translated into Turkish again. Kilis and Yıldırım (2018) translated 24 items on the scale of online self-regulation into Turkish by 9 experts. Then, the questions translated into Turkish were translated back to English separately by the two linguists and the scale was compared with the original. As the results of the confirmatory factor analysis were found to be sufficient and acceptable, the validity of the scale was ensured. The online self-regulation scale translated into Turkish was found to be highly reliable because the Cronbach's alpha internal consistency coefficient calculated in the reliability test varied between 0.95 and the factors' Cronbach's alpha internal consistency coefficients ranged between 0.67 and 0.87.

3.5.2. Moodle Miner

Data mining tools should be user-friendly interface, configuration to algorithms and not too complex for use by educators (Romero, Ventura, & Garcia, 2007). According to Bayazit and Akcapinar (2018), in order to record and analyze video interaction data, data on students' video surveillance behaviors are needed. In most of the learning management systems (LMS), the data are not recorded, so using data in the studies are based on data obtained from edX platform (Guo et al., 2014; Kim et al., 2014), Youtube analytics (Schiltz, 2015) or the data collected by researchers self-developed applications (Chorianopoulos, Giannakos, & Chrisochoides, 2014) are provided.

By using the tool developed by Bayazit and Akcapinar (2018), the interaction between the students during the video viewing processes is recorded in the line created in the Moodle database by recording one line of user information, the date and time of the interaction, the type of interaction, and the detailed information of the interaction (type of interaction, detailed information on the content of the comment or reply text if timeline is available). As the log data obtained from Moodle is systematically complex, they developed a pre-processing software to analyze these data and performed various data pre-processing before analysis process to create the data to be exported. In consequence of the pre-processing, the data which are the number of video views of students, the video watching behaviors shown in different sessions, video interaction data such as play-stop-seek and reading processes in the comments section obtained from the table created in the Moodle Learning Management System (LMS) database.

The variables used in the moodle miner tool used in the research and their explanations are as follows:

- n_Session: Total number of times logged in.
- n_TotalAction: Total playback, pause, skip, etc. in the number of videos interactions.

- d_Time: Total time on video watching in seconds.
- final: Final exam results

3.5.3. Video Analytics Tool (VAT)

Video analytics is described that online environment allowing to analyze students' interaction in online content with using database. The use of video-based learning materials increased the use of video in online course. Using video-based learning materials help to understand students' learning process and to develop learning environments by observing students' video watching behavior (Bayazit & Akçapınar, 2018).

Many tools such as MRAS, MAT, VLAS etc. for learning have been developed in the way of watching videos. According to Barger and colleagues, MRAS (Microsoft Research Annotation System), which is one of the studies to improve the learning process in video watching behaviors, has been developed as a collaborative interactive web-based note sharing system thanks to the sections that allow to take written or auditory notes in the videos when needed (1999). Similarly, Colasante and Fenn (2009) argued that MAT (Media Annotation Tool) is evaluated on video material for online learning with notes, comments, outcome, instructive's feedback and result reflections, and enables students, peers, and educators to discuss. Correlatively, in compliance with M. Giannakos et al. (2015), the VLAS (Video Learning Analytics System) which is a visualization interface for video analytics data is used to report learner.

According to Kim and colleagues (2014), edX is a pioneering system in mass online courses (MOOC) that record video watching behaviors. In this system, all interactions of the users are kept as log data and visualization of video watching behavior (play, skip, stop, and jump) is important. In a similar manner, SocialSkip allows many video libraries such as Youtube, Vimeo, Khan Academy, etc., where users' responses via Google Forms, and the interaction of the added videos are recorded on Google servers (Chorianopoulos et al., 2014;

Chorianopoulos, Leftheriotis, & Gkonela, 2011). On the other hand, Ozan and Ozarslan (2016) Kaltura has sections supported by Massive Open Online Lessons (MOOC) and visualized by Google Analytics with video interactive (play, stop, etc.) log data by establishing the relationship between objects through the ontology base between video sections. Besides, Agnew, Mills and Maher (2010) supported that VMCAlytic which is an interactive collaborative video note taking and renewable analytic tool develop individual teaching and research performance. Web-based open-source for paid / free video library resources such as YouTube, Khan Academy allow taking notes, but their lack of integration with learning management systems limits researchers and educators in examining log data. Unlike these, the video analytical tool was developed by Bayazit and Akcapinar (2018) allows for notetaking, as well as other tools, in addition to evaluating student activities in flipped classes by using the Moodle learning management system (Farias, Sales, Gonçalves, Machado, & Leite, 2017; Wang, 2017).

This tool is based on distance learning to evaluate its' impact on student achievement (Aydogdu & Tanrikulu, 2013; Swart, 2015). Moreover, Moodle system is focused on teachers and students. It provides the sharing of many materials such as creating course content, developing online exams and assignments, creating forums, books, worksheets, videos, and online resources. The task of the students here is to participate in many activities such as commenting on the subject, initiating discussion, participating in online exams, loading homework in this system created by their teachers. The Moodle system enables educators and researchers to access log data for a platform with the ability to forward or backward video and stop video to take notes at any time and add chapters to videos.

The variables used in the video analytics tool used in the research and their explanations are as follows:

- n_VideoCount: Total number of video count in the timeline

- n_VideoLoad: Total number of loading video in the timeline
- n_VideoPlay: Total number of times the relevant video's play button pressing or click.
- n_VideoPause: Total number of pauses by pressing the pause key of the corresponding video or by clicking on the video being watched.
- n_VideoSeek: Total number of seeking video in the timeline.
- n_ForwardSeek: Total number of forward in the timeline of the video
- n_BackwardSeek: Total number of backward in the timeline of the video

3.6. Assumptions

It is assumed that data collection tools are sufficient to measure the effects of self-regulation skills on students' interaction and success in flipped classroom. The questionnaire used within the scope of the research provides 24 items for this subject.

1. The volunteers who participated in the study are able to perform the instructions with self-abnegation.

2. All participants are allowed to access and join in activities the course materials online by creating a Moodle account.

3. To eliminate all obstacles that may occur during the classroom assessment, online assignments have been loaded and it is given to time all participants to upload file in the Moodle system within a certain period so that they can do them completely.

3.7. Limitations

There are some limitations in this study when students' self-regulation skills affect students' interaction and success in flipped classroom:

1. The participants who are from department of counselling and guidance at Yeditepe University in İstanbul are not heterogenous group.

2. In this study, only LMS (Moodle) is used for data collection tool which includes videos, texts, applications, and online exercises etc. While many different e-learning platforms will be used, it is preferred only Moodle which must use interface easily.

3. The participants of the experiment are only psychology students from two sections in Yeditepe University.

4. Taking this course as elective may not be highly effective in terms of students' attitudes towards the course and their level of using self-regulation skills.

3.8.Data Analysis

40 questions for the post-test are applied information technologies course. As a result of the post-test evaluation, self- regulation scale is used to reveal the positive and less positive effect of online courses on self- regulation skills in flipped classroom. Furthermore, Cronbach's alpha (α), was applied for internal consistency. Cronbach's alpha plays an important role in reliability because it is the most important part of the evaluation.

First, in case the online learning environment interactions between students with high and low self-regulation skills have normal distribution, Kolmogorov-Smirnov normality test will be used to determine whether there is a difference between group1 and group2 in terms of session, total action, and time variables. If there is not normal distribution, it will be analyzed by Mann-Whitney U which is a non-parametric independent group comparison. Secondly, in the even that video interactions between students with high and low self-regulation skills have normal distribution, if there is a difference between group1 and group2 in terms of forward seek, backward seek, different video count, video load, video play, video pause and video

seek variables, Kolmogorov-Smirnov normality test will be applied. Whether there is no normal distribution, it will be assayed by Mann-Whitney U which is a non-parametric independent group comparison. Finally, as for that the course achievement between students with high and low self-regulation skills have normal distribution, Kolmogorov-Smirnov normality test will be used to designate if there is a difference between group1 and group2 in terms of the final exam variables. If there is a normal distribution, independent groups will be analyzed by t-tests.

4. RESULTS

RQ1: Is there a significant difference between high and low self-regulated students in terms of online learning environment interactions?

Self-regulation questionnaire is consisting of 24 items with a maximum score of 120. Our participants' descriptive statistics according to the questionnaire is as given below:

Table 2. Descriptive Statistics of Online Self-Regulated Learning Questionnaire

| Mean | Median | Std. Deviation | Variance | Minimum | Maximum |
|-------|--------|----------------|----------|---------|---------|
| 93,99 | 96,00 | 17,80 | 316,87 | 25,00 | 120,00 |

Study participants (N=80) filled the questionnaire with minimum 25 and maximum 120 scores. Their scores median was 96. Thus, we decided to divide our participant group into 2 groups of students whose scores are higher than 96 (high self-regulated learners, SR=2) and lower than 96 (low self-regulated learners, SR=1). Please see Appendix B for descriptive statistics of self-regulated groups with learning management system interactions.

To answer this research question, we compared number of sessions, number of total actions and time duration between high and low self-regulated student groups.

Table 3. Test of normality results according to SF groups with LMS interactions

| Self-Regulation | | Shapiro-Wilk | | |
|-----------------|---|--------------|----|------|
| | | Statistic | df | Sig. |
| n_Session | 1 | ,869 | 39 | ,000 |
| | 2 | ,707 | 41 | ,000 |
| n_TotalAction | 1 | ,881 | 39 | ,001 |
| | 2 | ,925 | 41 | ,010 |
| d_Time | 1 | ,822 | 39 | ,000 |
| | 2 | ,747 | 41 | ,000 |

Normality assumptions was not supported for self-regulated learning groups with learning management system interactions. Thus, we applied Mann-Whitney U test in order compare their online learning environment interactions.

Table 4. Mann Whitney U Test Results

| | n_Session | n_TotalAction | d_Time |
|------------------------|-----------|---------------|---------|
| Mann-Whitney U | 731,000 | 669,500 | 706,000 |
| Z | -,661 | -1,251 | -,900 |
| Asymp. Sig. (2-tailed) | ,509 | ,211 | ,368 |

We found no significant difference between the variables. In other words, there is no significant difference between high and low self-regulated students in terms of online learning environment interactions.

RQ2: Is there a significant difference between high and low self-regulated students in terms of video watching interactions?

To determine whether there is a significant difference in terms of video interactions between students with high (SR = 2) and low self-regulation (SR = 1) skills, firstly, the normal distribution was examined:

Table 5. Test of Normality for Video Watching Interaction Variables

| | | Shapiro-Wilk | | |
|------------------|---|---------------------|----|------|
| | | Statistic | df | Sig. |
| n_ForwardSeek | 1 | 0,7 | 39 | 0 |
| | 2 | 0,88 | 41 | 0 |
| n_BackwardSeek | 1 | 0,64 | 39 | 0 |
| | 2 | 0,85 | 41 | 0 |
| n_diffVideoCount | 1 | 0,94 | 39 | 0,05 |
| | 2 | 0,93 | 41 | 0,01 |
| n_VideoLoad | 1 | 0,82 | 39 | 0 |
| | 2 | 0,85 | 41 | 0 |
| n_VideoPlay | 1 | 0,89 | 39 | 0 |
| | 2 | 0,91 | 41 | 0 |
| n_VideoPause | 1 | 0,9 | 39 | 0 |
| | 2 | 0,91 | 41 | 0 |
| n_VideoSeek | 1 | 0,73 | 39 | 0 |
| | 2 | 0,91 | 41 | 0 |

Normal distribution for the group of pairs was not supported and Mann-Whitney U which was a non-parametric independent group comparison was applied. Please see Appendix C for descriptive statistics of self-regulated groups with their interactions with video materials.

Table 6. Mann-Whitney U Test of video watching interactions.

| | Test Statistics ^a | | | | | | |
|------------------------|------------------------------|-------------|-------------|--------------|-------------|---------------|----------------|
| | n_diffVideoCount | n_VideoLoad | n_VideoPlay | n_VideoPause | n_VideoSeek | n_ForwardSeek | n_BackwardSeek |
| Mann-Whitney U | 703,50 | 632,00 | 702,50 | 723,50 | 633,00 | 664,00 | 669,00 |
| Z | -0,93 | -1,61 | -0,93 | -0,73 | -1,60 | -1,30 | -1,26 |
| Asymp. Sig. (2-tailed) | 0,35 | 0,11 | 0,35 | 0,46 | 0,11 | 0,19 | 0,21 |

a. Grouping Variable: SR

The number of different video count, the number of video load, the number of video play, the number of video pause, the number of videos seek, the video forward and backward seek numbers were compared, but there was no significant difference. In other words, there is no significant difference between high and low self-regulated students in terms of video watching interactions.

RQ3: Is there a significant difference in terms of course success between the students with high and low self-regulation skills?

We compared course final examination scores of the students with high (SR = 2) and low self-regulation (SR = 1) skills.

Table 7. Test of Normality for Course Final Examination Based on Self-Regulated Learning Groups

| | SR | Shapiro-Wilk | | |
|--------------|----|--------------|----|------|
| | | Statistic | df | Sig. |
| final | 1 | 0,97 | 39 | 0,43 |
| | 2 | 0,97 | 39 | 0,36 |

There is a normal distribution. For this reason, independent groups t-test was applied. Please see Appendix D for descriptive statistics of self-regulated groups with their final exam scores.

Table 8. Independent Samples Test of Course Success.

| | | Independent Samples Test | | | | |
|-------|-----------------------------|--------------------------|-------------------------|-----------------|-----------------|-----------------------|
| final | | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| | | | Equal variances assumed | 0,43 | 76,00 | 0,67 |
| | Equal variances not assumed | 0,43 | 67,59 | 0,67 | 1,15 | 2,69 |

Final scores were compared but there was no significant difference between the groups. There is no significant difference in terms of course success between the students with high and low self-regulation skills.

5. DISCUSSION

This study investigated the effects of self-regulation skills on students' interaction and success in flipped classroom. The results showed that there was no significant difference between students with high or low self-regulation and their online learning environment, video-watching interaction, and success. The results were examined by looking at the following 3 topics in this study: As a result of tests that different learning environments, video watching interactions and academic achievements did not have a positive or negative effect especially on university students with high and low self-regulation skills.

In the first phase, watching video increases students' video interaction, their interactions increase students with Moodle interaction in flipped classroom. Interestingly, there was no important difference. In the literature, according to Triantafyllou et al. (2015), training video issues uploaded to Moodle, students stated that their motivation decreased, and they were confused due to problems. By way of contrast, Nouri (2016), Using Moodle as a learning management system has been found to be beneficial in terms of students 'being able to see the questions asked by other students and their teachers' responses to the questions. By this means, not only teacher-student communication but also the motivation of the students will be supported. In another phase, successful students use more video interaction in flipped classroom. As shown in Table 5 and 6, $n_diffVideoCount$ $SD=0.35$, $n_VideoLoad$ $SD=0.11$, $n_VideoPlay$ $SD= 0.35$, $n_VideoPause$ $SD=0.46$, $n_VideoSeek$ $SD= 0.11$, $n_ForwardSeek$ $SD= 0.19$, $n_BackwardSeek$ $SD=0.21$ are deduced from test. Therefore, students who normally had a high degree of self-regulation in the expected situation before doing this test were expected to be more involved in video interaction in flipped classroom.

McLaughlin and colleagues (2013), stated that LMS in an flipped classroom without the need for teaching-learning activities in a specific classroom setting, students can increase their interaction with their friends inside or outside a classroom. It was found that teaching,

cooperative and learning community was created flipped the classroom and helped students to change their communication positively in problem solving (Roach, 2014; Kim et al., 2014). In addition to this, students' social interactions with the instructors and with each other in the learning environment including content (Woo & Reeves, 2007; Sarıkaya, 2015) are more effective than the traditional classroom that does not use technology (Wang, 2013). Other hypothesis is that successful students use Moodle interaction in flipped classroom. The rejection of this hypothesis was presented in the first hypothesis. Unexpectedly, it was found that there was no significant difference. According to You (2016), the fact that LMS is identified as the most important SRL behavior defined by online instruction data supports increasingly achieving higher success in students who self-regulate access to course materials methodologically. Successful students' performance has more effort than unsuccessful students' performance based on video analytics and self- regulation in flipped classroom. Normally, expected result is more significant difference. In literature, when peer to peer interaction and their academic achievement was examined by Bakharia and Dawson (2011) temporarily attendance in the LMS, Michinov et al. (2011) argued that the deficiency of participation in platform during the learning process positively correlates with delay and underperformance.

In the study of Vauras et al. (2001), students who have high rates of success expectations are at a level that they can regulate their own learning by themselves, and they learn in detail by examining the content of their lessons in more depth. Moreover, when successful and unsuccessful students were compared, they found that self-regulating students were more successful in their behavior and self-regulation.

In a study conducted with the students of the English department at Turkish University, Inan (2013) found that the higher the students' self-regulation, the higher the grade point averages of the courses, and the more successful students are when they try to regulate

their learning by themselves, this effort is also reflected in their grades and scores. When Kızılcec et al. (2017) examined the learning strategies of online resources with a questionnaire from 4831 students, they found that the use of the internet and the content of the videos in the course facilitated the students' success levels and that students with higher self-regulation skills in the online system were more successful than students with low self-regulation skills.

Broadbent and Poon (2015) achieved online and high academic results in the implementation of time management, effort regulation, critical thinking, and metacognitive strategies in online studies with self-regulation for the higher education context conducted between 2004-2014. Similarly, according to the research conducted by Sun, Wu, and Lee (2017), when they compared the effect of self-regulation and social connectedness with those traditionally taught on students studying in the University Preparatory class using the flipped classroom strategy, they concluded that the flipped classroom arrangement could increase students' self-regulation.

The Blackboard platform is used during the lesson time to facilitate the learning model and improve students' implementation, learning and self-regulation skills. (Nguyen & Ikeda, 2015). In addition to this, Jwair (2018) argued that the flipped classroom was more effective than the traditional method in increasing the increased self-regulation in learning among students by offering a way of discussion through the forum to facilitate the collaboration of students, as they seek outside help to fulfill their need for learning (Sun et al., 2017).

When the relationship between students with high and low self-regulation skills in online learning environments, video watching interactions and course achievements is evaluated, there is no significant difference only when evaluated according to the information obtained from these research results.

In order to analyze the effects of self-regulation skills on university students who continue their information technology course interactions, the effects of self-control skills on students' interaction and success in the translated classroom were examined in flipped classroom. For this purpose, the results are shown above by applying the semi-experimental model to a single experimental group that does not have a control group, by applying only the post-test experimental design. Both sections used fully flipped classroom. The content of course was presented and shared using with Moodle as LMS before class time, there was much more time for during class time for activity and answer to participants' questions during the lecture time. Considering future work in this field and in addition to this study, investigating the effect of pre-test, post-test relationship and examining students' motivations on self-regulation skills in future research both supports this study and helps to contribute to the literature by adding new information. According to the study, the structure of the student population, the differences in cognitive knowledge levels, self-regulation skills, and not taking the course compulsory may cause no significant difference in the results of the investigated questions.

6. CONCLUSION

The current study implemented to reveal an answer to difference in terms of interaction and performance among participant with different levels of self-regulation in the application of the flipped classroom. The findings remarked that Psychology students' self-regulation skills had no positive or negative effect in the flipped classroom.

Implementation of flipped classroom' advantages were theoretical understanding of students' self-regulation process, facilitating active, blended, online, cooperative, collaborative, peer-assisted learning, and student-center teaching, improving peer assessments between status of students' individual and groups in the flipped interpreting teaching in the flipped classroom. According to Bergmann and Sams (2012), flipped classroom provides learner-learner and instructor-learner interaction. From this point of view, flipped classroom has some conveniences and challenges. Flipped classroom is student-centered instruction. Therefore, instructional objectives which transform into students' learning styles and improve lifelong learning are required ability. By means of the ability of students to self-regulation, the ability of the student to watch and listen to these contents at any time, at any place and as many times as desired can be considered as an advantage to increase students' success using learning management system. In addition, students can follow the topic from online materials, do their homework and ask the instructor the places they do not understand, or find answers to their questions instantly as they have the chance to see the questions they have asked before. On the contrary, it is difficult to balance students' motivations in the flipped classroom as in face-to-face education. For this reason, since students need to have eye contact with the teacher while they are studying, or the need to progress in the form of questions and answers instantly, and the constant use of the internet on the screen and the ability of students to access different sites outside the classroom, this can negatively affect the students' attendance.

In this study, the course materials and assignments were regularly organized in accordance with the weekly course schedule by using Moodle LMS for students in certain periods. Accordingly, only the final test was done and the students' exam grades and video watching times, how long they watch the videos and how many times they watched or skipped were recorded on the Moodle system. Self-regulation scale test was applied to the students to determine the criteria of self-regulation. As a result, no significant difference was found in our hypotheses in the research questions. Examining the relationship between student motivation, culture level and self-improvement level of the student in different fields will contribute to the literature in future studies on this subject.

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APPENDICIES

Appendix A : Türkçe Çevrimiçi Öz-Düzenleme Ölçeği (Kilis ve Yıldırım, Çukurova Üniversitesi Eğitim Fakültesi Dergisi, Vol: 47, No:1, Sayfa:233-245)

(FYI: Please get in contact with the authors for the questionnaire)

Kesinlikle
Katılmıyorum
Katılmıyorum
Kararsızım
Katılıyorum
Kesinlikle
Katılıyorum

Hedef Belirleme

1. Çevrimiçi derslerdeki ödevlerim için ölçütler belirlerim.

Çevre Düzenlemesi

6. Çalışma ortamımı fazla dikkat dağıtacak şeylerden uzak olacak şekilde seçerim.

Ders Çalışma Stratejileri

10. Çevrimiçi dersler için daha ayrıntılı notlar tutmaya çalışırım, çünkü ders notları çevrimiçi öğrenmede normal sınıftaki öğrenmeye göre daha önemlidir.

Zaman Yönetimi

14. Zaman alıcı olduğumu bildiğim için çevrimiçi derslerime çalışırken fazladan zaman ayırırım.

Yardım İsteği

17. Ders içeriğine hâkim bilgili birini bulurum, böylece yardıma ihtiyacım olduğunda ona danışabilirim.

Öz Değerlendirme

21. Çevrimiçi derslerde ne öğrendiğimi anlamak için öğrendiklerimi özetlerim.

24. Sınıf arkadaşlarımdan öğrendiğinden farklı ne öğrendiğimi anlamak için onlarla konuşurum.

APPENDIX B. Descriptive Statistics for Self-Regulated Learning Groups and Learning Management System Interactions

| SR | | | Statistic | Std. Error |
|---------------|---|----------------------------------|------------|------------|
| | 1 | Mean | 11,13 | ,911 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 9,28 | |
| | | Upper Bound | 12,97 | |
| | | 5% Trimmed Mean | 10,58 | |
| | | Median | 11,00 | |
| | | Variance | 32,378 | |
| | | Std. Deviation | 5,690 | |
| | | Minimum | 4 | |
| | | Maximum | 33 | |
| | | Range | 29 | |
| | | Interquartile Range | 6 | |
| | | Skewness | 1,700 | ,378 |
| | | Kurtosis | 4,722 | ,741 |
| | 2 | Mean | 13,27 | 1,628 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 9,98 | |
| | | Upper Bound | 16,56 | |
| | | 5% Trimmed Mean | 11,96 | |
| | | Median | 11,00 | |
| | | Variance | 108,651 | |
| | | Std. Deviation | 10,424 | |
| | | Minimum | 2 | |
| | | Maximum | 63 | |
| | | Range | 61 | |
| | | Interquartile Range | 9 | |
| | | Skewness | 3,059 | ,369 |
| | | Kurtosis | 12,586 | ,724 |
| n_TotalAction | 1 | Mean | 1053,49 | 105,452 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 840,01 | |
| | | Upper Bound | 1266,96 | |
| | | 5% Trimmed Mean | 993,95 | |
| | | Median | 777,00 | |
| | | Variance | 433684,993 | |
| | | Std. Deviation | 658,548 | |
| | | Minimum | 237 | |
| | | Maximum | 3267 | |
| | | Range | 3030 | |
| | | Interquartile Range | 831 | |
| | | Skewness | 1,390 | ,378 |

| | | | | | |
|--------|---|----------------------------------|-------------|------------|---------|
| | | Kurtosis | | 2,333 | ,741 |
| | 2 | Mean | | 1210,71 | 106,002 |
| | | 95% Confidence Interval for Mean | Lower Bound | 996,47 | |
| | | | Upper Bound | 1424,95 | |
| | | 5% Trimmed Mean | | 1183,77 | |
| | | Median | | 1065,00 | |
| | | Variance | | 460697,712 | |
| | | Std. Deviation | | 678,747 | |
| | | Minimum | | 18 | |
| | | Maximum | | 2699 | |
| | | Range | | 2681 | |
| | | Interquartile Range | | 892 | |
| | | Skewness | | ,781 | ,369 |
| | | Kurtosis | | -,048 | ,724 |
| d_Time | 1 | Mean | | 371,67 | 36,363 |
| | | 95% Confidence Interval for Mean | Lower Bound | 298,05 | |
| | | | Upper Bound | 445,28 | |
| | | 5% Trimmed Mean | | 349,52 | |
| | | Median | | 327,00 | |
| | | Variance | | 51568,860 | |
| | | Std. Deviation | | 227,088 | |
| | | Minimum | | 96 | |
| | | Maximum | | 1066 | |
| | | Range | | 970 | |
| | | Interquartile Range | | 237 | |
| | | Skewness | | 1,746 | ,378 |
| | | Kurtosis | | 3,334 | ,741 |
| | 2 | Mean | | 429,20 | 49,634 |
| | | 95% Confidence Interval for Mean | Lower Bound | 328,88 | |
| | | | Upper Bound | 529,51 | |
| | | 5% Trimmed Mean | | 393,50 | |
| | | Median | | 364,00 | |
| | | Variance | | 101005,061 | |
| | | Std. Deviation | | 317,813 | |
| | | Minimum | | 9 | |
| | | Maximum | | 1946 | |
| | | Range | | 1937 | |
| | | Interquartile Range | | 284 | |
| | | Skewness | | 2,921 | ,369 |
| | | Kurtosis | | 12,473 | ,724 |

APPENDIX C. Descriptive Statistics for Self-Regulated Learning Groups and Video Material Interactions

| SR | | | Statistic | Std. Error | | |
|----------------|---|----------------------------------|---------------------|-----------------|--------|--|
| n_ForwardSeek | 1 | Mean | 151,28 | 25,483 | | |
| | | 95% Confidence Interval for Mean | | | | |
| | | | Lower Bound | 99,70 | | |
| | | | Upper Bound | 202,87 | | |
| | | | 5% Trimmed Mean | 129,81 | | |
| | | | Median | 102,00 | | |
| | | | Variance | 25325,313 | | |
| | | | Std. Deviation | 159,139 | | |
| | | | Minimum | 10 | | |
| | | | Maximum | 888 | | |
| | | | Range | 878 | | |
| | | | Interquartile Range | 130 | | |
| | | | Skewness | 2,973 | ,378 | |
| | | | Kurtosis | 11,690 | ,741 | |
| | 2 | Mean | | 187,78 | 23,495 | |
| | | 95% Confidence Interval for Mean | | | | |
| | | | Lower Bound | 140,29 | | |
| | | | Upper Bound | 235,27 | | |
| | | | | 5% Trimmed Mean | 175,48 | |
| | | | | Median | 131,00 | |
| | | | Variance | 22632,976 | | |
| | | | Std. Deviation | 150,443 | | |
| | | | Minimum | 4 | | |
| | | | Maximum | 612 | | |
| | | | Range | 608 | | |
| | | | Interquartile Range | 212 | | |
| | | | Skewness | 1,146 | ,369 | |
| | | | Kurtosis | ,706 | ,724 | |
| n_BackwardSeek | 1 | Mean | 152,28 | 22,627 | | |
| | | 95% Confidence Interval for Mean | | | | |
| | | | Lower Bound | 106,48 | | |
| | | | Upper Bound | 198,09 | | |
| | | | 5% Trimmed Mean | 129,40 | | |
| | | | Median | 108,00 | | |
| | | | Variance | 19967,997 | | |
| | | | Std. Deviation | 141,308 | | |
| | | | Minimum | 22 | | |
| | | | Maximum | 752 | | |
| | | | Range | 730 | | |
| | | | Interquartile Range | 91 | | |
| | | | Skewness | 3,091 | ,378 | |

| | | | | | |
|------------------|---|----------------------------------|-------------|-----------|--------|
| | | Kurtosis | | 10,635 | ,741 |
| | 2 | Mean | | 168,17 | 17,834 |
| | | 95% Confidence Interval for Mean | Lower Bound | 132,13 | |
| | | | Upper Bound | 204,21 | |
| | | 5% Trimmed Mean | | 156,26 | |
| | | Median | | 149,00 | |
| | | Variance | | 13039,545 | |
| | | Std. Deviation | | 114,191 | |
| | | Minimum | | 0 | |
| | | Maximum | | 559 | |
| | | Range | | 559 | |
| | | Interquartile Range | | 121 | |
| | | Skewness | | 1,730 | ,369 |
| | | Kurtosis | | 3,812 | ,724 |
| n_diffVideoCount | 1 | Mean | | 15,87 | ,895 |
| | | 95% Confidence Interval for Mean | Lower Bound | 14,06 | |
| | | | Upper Bound | 17,68 | |
| | | 5% Trimmed Mean | | 15,80 | |
| | | Median | | 15,00 | |
| | | Variance | | 31,273 | |
| | | Std. Deviation | | 5,592 | |
| | | Minimum | | 7 | |
| | | Maximum | | 26 | |
| | | Range | | 19 | |
| | | Interquartile Range | | 9 | |
| | | Skewness | | ,365 | ,378 |
| | | Kurtosis | | -,881 | ,741 |
| | 2 | Mean | | 16,90 | ,969 |
| | | 95% Confidence Interval for Mean | Lower Bound | 14,94 | |
| | | | Upper Bound | 18,86 | |
| | | 5% Trimmed Mean | | 17,11 | |
| | | Median | | 16,00 | |
| | | Variance | | 38,490 | |
| | | Std. Deviation | | 6,204 | |
| | | Minimum | | 3 | |
| | | Maximum | | 26 | |
| | | Range | | 23 | |
| | | Interquartile Range | | 12 | |
| | | Skewness | | ,002 | ,369 |
| | | Kurtosis | | -,791 | ,724 |
| n_VideoLoad | 1 | Mean | | 34,62 | 3,755 |
| | | 95% Confidence Interval for Mean | Lower Bound | 27,01 | |

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|-------------|---|----------------------------------|-----------|--------|
| | | Upper Bound | 42,22 | |
| | | 5% Trimmed Mean | 31,88 | |
| | | Median | 30,00 | |
| | | Variance | 550,032 | |
| | | Std. Deviation | 23,453 | |
| | | Minimum | 9 | |
| | | Maximum | 124 | |
| | | Range | 115 | |
| | | Interquartile Range | 29 | |
| | | Skewness | 1,964 | ,378 |
| | | Kurtosis | 5,051 | ,741 |
| | 2 | Mean | 43,54 | 4,663 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 34,11 | |
| | | Upper Bound | 52,96 | |
| | | 5% Trimmed Mean | 40,34 | |
| | | Median | 37,00 | |
| | | Variance | 891,605 | |
| | | Std. Deviation | 29,860 | |
| | | Minimum | 3 | |
| | | Maximum | 143 | |
| | | Range | 140 | |
| | | Interquartile Range | 34 | |
| | | Skewness | 1,708 | ,369 |
| | | Kurtosis | 3,777 | ,724 |
| n_VideoPlay | 1 | Mean | 368,79 | 35,783 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 296,36 | |
| | | Upper Bound | 441,23 | |
| | | 5% Trimmed Mean | 347,47 | |
| | | Median | 289,00 | |
| | | Variance | 49935,641 | |
| | | Std. Deviation | 223,463 | |
| | | Minimum | 97 | |
| | | Maximum | 1116 | |
| | | Range | 1019 | |
| | | Interquartile Range | 302 | |
| | | Skewness | 1,287 | ,378 |
| | | Kurtosis | 2,314 | ,741 |
| | 2 | Mean | 420,54 | 38,858 |
| | | 95% Confidence Interval for Mean | | |
| | | Lower Bound | 342,00 | |
| | | Upper Bound | 499,07 | |
| | | 5% Trimmed Mean | 404,86 | |
| | | Median | 371,00 | |

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|--------------|---|----------------------------------|-------------|-----------|--------|
| | | Variance | | 61907,405 | |
| | | Std. Deviation | | 248,812 | |
| | | Minimum | | 6 | |
| | | Maximum | | 1095 | |
| | | Range | | 1089 | |
| | | Interquartile Range | | 287 | |
| | | Skewness | | 1,103 | ,369 |
| | | Kurtosis | | 1,112 | ,724 |
| n_VideoPause | 1 | Mean | | 335,87 | 32,289 |
| | | 95% Confidence Interval for Mean | Lower Bound | 270,51 | |
| | | | Upper Bound | 401,24 | |
| | | 5% Trimmed Mean | | 317,91 | |
| | | Median | | 272,00 | |
| | | Variance | | 40660,588 | |
| | | Std. Deviation | | 201,645 | |
| | | Minimum | | 85 | |
| | | Maximum | | 966 | |
| | | Range | | 881 | |
| | | Interquartile Range | | 274 | |
| | | Skewness | | 1,116 | ,378 |
| | | Kurtosis | | 1,637 | ,741 |
| | 2 | Mean | | 378,93 | 35,946 |
| | | 95% Confidence Interval for Mean | Lower Bound | 306,28 | |
| | | | Upper Bound | 451,58 | |
| | | 5% Trimmed Mean | | 362,26 | |
| | | Median | | 343,00 | |
| | | Variance | | 52977,370 | |
| | | Std. Deviation | | 230,168 | |
| | | Minimum | | 4 | |
| | | Maximum | | 1045 | |
| | | Range | | 1041 | |
| | | Interquartile Range | | 282 | |
| | | Skewness | | 1,176 | ,369 |
| | | Kurtosis | | 1,594 | ,724 |
| n_VideoSeek | 1 | Mean | | 306,90 | 43,133 |
| | | 95% Confidence Interval for Mean | Lower Bound | 219,58 | |
| | | | Upper Bound | 394,21 | |
| | | 5% Trimmed Mean | | 273,90 | |
| | | Median | | 194,00 | |
| | | Variance | | 72556,305 | |
| | | Std. Deviation | | 269,363 | |
| | | Minimum | | 40 | |

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|---|----------------------------------|-------------|-----------|--------|
| | Maximum | | 1218 | |
| | Range | | 1178 | |
| | Interquartile Range | | 255 | |
| | Skewness | | 2,158 | ,378 |
| | Kurtosis | | 4,616 | ,741 |
| 2 | Mean | | 360,02 | 38,094 |
| | 95% Confidence Interval for Mean | Lower Bound | 283,03 | |
| | | Upper Bound | 437,02 | |
| | 5% Trimmed Mean | | 341,27 | |
| | Median | | 310,00 | |
| | Variance | | 59497,174 | |
| | Std. Deviation | | 243,920 | |
| | Minimum | | 4 | |
| | Maximum | | 1134 | |
| | Range | | 1130 | |
| | Interquartile Range | | 299 | |
| | Skewness | | 1,237 | ,369 |
| | Kurtosis | | 1,577 | ,724 |

APPENDIX D. Descriptive Statistics for Self-Regulated Learning Groups and Their Exam Scores

| SR | Statistic | Std. Error |
|--------|----------------------------------|------------|
| Exam 1 | Mean | 1,76018 |
| | 95% Confidence Interval for Mean | |
| | Lower Bound | 75,8726 |
| | Upper Bound | 82,9992 |
| | 5% Trimmed Mean | 79,3732 |
| | Median | 80,0000 |
| | Variance | 120,831 |
| | Std. Deviation | 10,99233 |
| | Minimum | 60,00 |
| | Maximum | 100,00 |
| | Range | 40,00 |
| | Interquartile Range | 13,00 |
| | Skewness | ,378 |
| | Kurtosis | ,741 |
| 2 | Mean | 2,60395 |
| | 95% Confidence Interval for Mean | |
| | Lower Bound | 75,2982 |
| | Upper Bound | 85,8238 |
| | 5% Trimmed Mean | 81,8211 |
| | Median | 80,0000 |
| | Variance | 278,002 |
| | Std. Deviation | 16,67341 |
| | Minimum | 20,00 |
| | Maximum | 100,00 |
| | Range | 80,00 |
| | Interquartile Range | 22,00 |
| | Skewness | ,369 |
| | Kurtosis | ,724 |