Effects of Active Learning on Students' Performance in Higher Learning Institutions

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Egemen Hanımoğlu*

* Dr. Öğr. Üyesi, Çukurova Üniversitesi, Eğitim Fakültesi, Adana/ Türkiye
E-Mail: ehanimoglu@gmail.com   **ORCID:** 0000-0001-7734-5013

Abstract

The study features analysis of the performance of 305 university students from Cukurova University at different grades. The study aims to establish how the memories and overall performance regarding different study materials of students from diverse grades differ from each other. Qualitative study design was employed with data collected from students in three different courses. Results were tabulated as per the various courses under study. Two tables, featuring five most remembered concepts in all courses, and all course recall outcomes were also included to offer a cross-sectional view. The results pointed to a correlation between teaching methods and remembrance patterns in all the participants. Depending on the grade and the content, enhanced understanding of the course material was found to depend on the forms of class presentations adopted by the tutor. It is therefore important that the tutor choose appropriate teaching methods and techniques that would deliver optimal experiences to all the students in the same class. Notably, there were higher average and mean scores for course materials taught through video presentation compared to the rest of the learning forms.

Keywords: *Introductory psychology, active learning, statistics, cognitive psychology, memory.*

Yüksek Öğrenim Kurumlarında Aktif Öğrenmenin Öğrencilerin Performansına Etkisi

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Öz

Bu çalışma Çukurova Üniversitesi'nde farklı sınıflarda öğrenim gören 305 öğrencinin performans analizlerini sunmaktadır. Çalışma, öğrencilerin hafızalarının ve farklı çalışma materyallerine ilişkin genel performansının diğer sınıflarda öğrenim gören öğrencilerinkinden nasıl farklılaştığını tespit etmeyi amaçlamaktadır. Çalışmada nitel araştırma deseni kullanılmıştır ve veri üç farklı dersi alan öğrencilerden toplanmıştır. Sonuçlar, çalışmaya dahil edilen derslere göre tablolaştırılmıştır. Kesitsel görünümü sunmak için bütün derslerden en çok hatırlanan beş kavramı ve tüm derslerdeki hatırlama sonuçlarını gösteren iki tabloya da yer verilmiştir. Sonuçlar, tüm katılımcılarda öğretim yöntemleri ve anma kalıpları arasında bir korelasyon olduğuna işaret etmektedir. Öğrenim seviyesi ve ders içeriğine bağlı olarak, ders materyalinin daha iyi anlaşılması öğretmen tarafından benimsenen sunum biçimine bağlıdır. Bu sebeple dersi veren kişinin sınıftaki bütün öğrencilere en iyi deneyimleri kazandıracak materyalleri seçmesi büyük önem taşımaktadır. Özellikle video sunumu yoluyla öğretilen ders materyallerinin diğer öğrenme biçimlerine kıyasla daha yüksek ortalama puanlarına sahip olduğu görülmüştür.

Anahtar Kelimeler: *Psikolojiye giriş, aktif öğrenme, istatistik, bilişsel psikoloji, hafıza.*

Introduction

Education is a system that provides the society with solutions, enlightens its members, develops people, and improves individual skills. However, in the context of Adana, Turkey, the situation is different. The education system in Turkey, a system that is supposed to be a problem-solver, has turned out to be a problem in itself. Amasyalı (2013) identifies the education sector in Turkey as one of the social issues the country is currently facing. For some decades now, there has been a discussion over which civilization complex the country belongs to. This discussion features people who adopt the Western civilization (pro-Westerners), and those that believe that the "Turkish society is an Eastern society" (anti-Westerners). The discussions have affected many of the country's sectors ranging from social, political to economic. As Corlu, Capraro, and Capraro (2014) allude, the nature and history of socialization and civilization in a country have a significant impact on the form various fields within a state will take. For any reason, if there is disillusionment on whatever civilization method a country should build its platforms on, crisis becomes imminent. Such is the situation in Turkey. The Turkish economy is majorly made upon the Western civilization, while the political norms are built on the Eastern civilizations. However, within social networks, the education sector has never gotten a clean understanding on which culture to adopt.

A debate has divided Turkish community into two: the old and the new societies. The traditional view is that the country should be socialized and civilized based on the eastern civilization, while the new generation of thinkers advocate for a change in the country's social structures to adopt to and uphold the ideals of the Western civilization. The problem has had a trickledown effect, with many of the social sector's activities' affected. The old Turks and their way of thinking argue that the traditional education norms, featuring past and obsolete methods of teaching should be upheld in the country as a way of preserving their culture for the future generations (Mourshed, Farrell, & Barton, 2013). Uzair-ul-Hassan, Parveen, and Riaz (2016) identify this as a problem partially resonating from the fact that the country holds Muslim believes and adopting modern day technology in education provokes the anti-Westerners thinking that they are losing it to their old rivals, the Western World. Mourshed, Farrell, and

Barton, (2013) state that what this group of people do not realize is the effects the old/ traditional education system has had on the student, the society and the country at large. For instance, Çelik and Gür (2013) identified that traditional teaching methods and teacher training programs focus majorly on theoretical impartation of skills as opposed to the modern day, research-based learning experiences. Mercan and Sezer (2014) say that the world today is facing stricter and more complex social problems that call for innovative solutions. As such, Çelik and Gür (2013) do not see any relevancy of the traditional teaching methods being advocated for by the Turkish society, thereby believing and pushing for Eastern civilization systems to be adopted. For example, the world today is faced by problems such as the threat of global warming and terrorism among others, and Uzair-ul-Hassan et al. (2016) say that we need new and innovative solutions.

Todd and Tivener (2016) argue that it is about time the Turkish government adopted new and comprehensive measures in their education system. This points to the inevitable move by society and more so, by the government towards the adoption of the educational norms of the Western civilization. The push for Western civilization education systems is backed up by evidence of the excellence in Turkey's economic policies after the approval of the same in the sector. For example, the country recorded close to 30 million tourists in 2017 after the department went fully digital (Ross, & Furno, 2011). With a GDP of 851.1 billion USD (2017), TeKippe, (2017) sees a bright future in the education affairs of Turkey, should they decide to switch to a Western civilization based system.

As the country continues to adopt more Westernized views on the education system, Ross and Furno (2011) argue that the society stands to benefit from various factors that come with the modern day education systems. Key among them is the new methods applicable in the sector. Active learning is an intervention of the current day teaching and learning courses, which has picked pace in more than half of the nations in the world. Çelik and Gür (2013) categorize active learning programs under the infamous constructivist theory, which is a product of the early twentieth century advanced by W. James and J. Dewey. The theory bases its argument on the fact that learners should acquire knowledge actively, and that there are increased chances of comprehension and remembrance by

the learners in cases where active learning methods are used. According to Keengwe (2015), knowledge is built on a concept after another. Given Karataş and Oral's (2015) sentiments, if there were no experiences due to lack of active learning from previous learning sessions, then students will have no concept to refer to in their new lesson. The result of such teaching and learning processes which lack active learning elements is low comprehension and performance by students.

Statement of the Problem

Learning outcomes for university students in Turkey are impacted on by teaching methods. So enormous are the impacts of teaching methods employed that some students have had to drop out of school. Given the importance of the education sector in the country, immediate measures should be adopted to address the current policy and related issues to save the situation (Ishiyama, 2013). Both the societal beliefs and the fear of losing their identity as a Muslim country have prompted laxity in the Turkish government to the adoption of the Western education systems. This is despite the glaring evidence of success in Western civilization systems as witnessed in the economic sector of the country. As the days go by, there is increased pressure for the government to act. This is based on the fact that the education sector has a role to play in the overall welfare of a country (Demir & Bruzzone, 2015). In the case of Turkey, the economy has been expanding over the last five decades to attain an all-time high in the freest economy index of 58 globally (Çiçen, 2016). The gesture from the economy prediction in Turkey points to only possibilities of advancement and no shrinking which calls for activity and matching development in the other significant sectors like education to maintain the expanded economy. The education sector is very significant in the production of the right skills and information regarding labor force that would keep such a vast economy running (Corlu, Capraro & Capraro, 2014). However, this will remain a mirage with the current Eastern education system within the country. This denotes the more significant challenge that the current administration in Turkey has to deal with as far as the education sector is concerned.

Aim and Objectives of the Research

The study aims to establish whether there exist any relationship between active learning strategies and the performance of students in higher learning institutions.

The specific research objectives include:
- To identify whether there exists a correlation between active learning and the students' performance in higher learning institution,
- To establish the effects of teaching methods on student's performance,
- To evaluate the role of instructors in the successful implementation of active learning methods in higher learning institutions, and
- To analyze the role of students in the execution of active learning in higher learning institutions.

Research Questions

To realize the above-stated study objectives, we tried to answer the following questions. Thus;
1. What is the relationship between using active learning methods and student performance in higher learning institutions?
2. What are the effects of teaching methods on students' performance?
3. What is the role of instructors in the successful execution of active learning in university institutions?
4. What role do students play in the implementation of active learning in university institutions?

Significance of the study

The study will provide basic knowledge to the education sector stakeholders in Turkey, and elsewhere it may be availed concerning the overall educational challenge of teaching methods employed by the tutors and how

they impact the performance of students at large (Bray, Mazawi, & Sultana, 2013). Since the research emphasizes active learning methods, readers will get to understand the concept better and how it can come in handy to address various teaching problems in the sector. To the tutors, the study will offer a detailed analysis of the challenges they face as they impart knowledge to the students. The relevance of active learning methods and the recommendations that will be provided by the study will add to their understanding of the subject matter. The government can benefit through understanding the challenge that has been resident in the education sector and how it can be solved for better outcomes in one of the strategic areas of the economy. This implication is in line with Healey, Pawson, and Solem (2013) who say the government will get to understand what educational policies to approve to demystify the challenges relative to the teaching methods which primarily resonate from the teachers teaching courses and developing curricula in higher learning institutions.

Literature Review

Theoretical Framework

The constructivist theory of learning and teaching was used in exploring the topic. The theory states that people perceive their own knowledge and understanding of the world through daily experiences, and repeated reflection on the experiences (Ishiyama, 2013). Whenever people encounter something new, they have to reconcile it with their previous experiences and ideas. The new experience may change what they believe, or the information may be discarded in the event that it is irrelevant. The theory argues that people are active creators of knowledge. Asking questions, explorations, and assessments are typical ways through which people create knowledge according to the constructivist theory.

In the classroom context, constructivist view of learning tends to point towards encouraging teachers to use active learning techniques such as real-world problem solving exercises and experiments to create and shape knowledge acquisitions among students. The teacher should understand a learner's existing concepts, and direct the learning process in a manner

that addresses and builds on the existing knowledge. Historical Underpinnings

Higher institutions of learning came into existence in the medieval times (5th to 15th century). Before medieval times, learning exercises were conducted in the form of a consistent apprenticeship trade between the learner and an assigned master. The apprentice would work hand in hand with the master until they attain such a level of skills set that they can venture on their own. However, with the inception of classroom-based learning in medieval times, apprenticeship learning methods dwindled and eventually faced out (Cooper, Downing, & Brownell, 2018). The incidence of knowledge impartation in a one-on-one situation hence came to an end. The essence of classroom-based learning was to have the tutor impart knowledge into several learners at a go. The students were supposed to sit and listen quietly and attentively to the educator.

Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt, and Wenderoth (2014) argue that long before the attention for active learning came into existence, teaching methods criticism already existed. Pawson and Solem (2013) denounced the traditional teaching methods noting that a good teaching model is one in which a student learns by doing. Uzair-ul-Hassan et al. (2016) backed up the argument by citing that, "experience and feeling are our real teachers" (Bray, Mazawi, & Sultana, 2013). Cooper, Downing and Brownell (2018) were of the view that an informative lecture was uninteresting to the student and one that would soon be forgotten. Ishiyama (2013) describes traditional teaching models as one that attached too much importance to words and would later yield "babblers" instead of learned students. Corlu et al. (2014) had their vision of how an excellent learning model should look like.

First, Demir and Bruzzone (2015) identified that students should be in charge of constructing their learning knowledge if it has to be meaningful to them. Secondly, they added that students learned best in situations they were actively involved and were free to interact with the learning material. This was in agreement with Uzair-ul-Hassan et al.'s (2016) argument that learning should be student-centered and at an individual level. Finally, Uzair-ul-Hassan et al. (2016) suggested that social interaction and cooperation should be a key strategy to the completion of tasks in the class setting since it reinforces remembrance and good understanding. Going

by Mach and Saldana's (2018) suggestions of an ideal learning atmosphere, the teacher has the responsibility to make sure that they create a good learning ambiance to enable students to develop knowledge for themselves as opposed to the traditional learning setting in which the tutor feeds the student with everything.

The supporters of the earliest forms of active learning, Başkan and Ayda (2018) and Mourshed, Farrell and Barton (2013) likened teaching to the provision of leadership. In their view, active learning is representative of the transformational and situational leadership methods rather than authoritarian leadership methods. The transformational leader is one who has the long-term welfare of the student in mind. Further, transformational leadership advocates for timely interjections of problems and finding innovative solutions to a problem in a manner that they will not manifest soon. Situational leadership, on the other hand, insists that the leader should be flexible, and ready to come up with solutions to unexpected challenges in their frontier of leadership. Başkan and Ayda (2018) crown the argument by Amasyalı, (2013) by stating that "learning is not a spectator activity," instead of an event in which both the player and the spectator are involved. The essence of the learner in the learning environment cannot be underestimated. Karpicke and Grimaldi (2016) say that a learner does not have to always listen to and agree with the tutor since they possess some amount of thinking ability the tutor may be lacking.

Amasyalı (2013) and Gibson (2015) further recommended active learning as a key in their seven principles to effective learning procedures. Subjecting the students to active learning at advanced stages like the university institution level would yield problems to the student since they will be spoilt for choices Amasyalı (2013). To strengthen the place of active learning in the level of education, Başkan and Ayda (2018) suggested that it is at a higher learning institution that students begin shaping their ideas and attitudes about life. As such, active learning helps them to get prepared for the more significant role they are to face later in the society of being independent and responsible since they can take care of their thinking and the consequences contained therein. Gibson (2015) asserts that the essence of education is to prepare the students for their later days in life and that if a learning method does not shape the efforts of education to-

wards this goal, then there is no point for it to be used to initiate or reinforce knowledge in students. The educator should, therefore, be a facilitator than they should be an all-knowing deliverer of information. Through facilitation, Mourshed, Farrell and Barton (2013) argue that there are higher chances that the learner will develop critical thinking skills which are essential to finding solutions in the society which is the principle reason behind education.

Contemporary Research

In a passive learning environment like a lecture, students are not required to participate actively either to watch a video or to engage in task reading. Unlike in a passive learning setting, in active learning, there is a higher degree of student involvement. Gibson (2015) suggests that learning institutions and faculties should be on the case of those accustomed to passive learning to encourage them to provide a free learning environment, which can allow the students to make contributions. However, with the perceived importance of active education, scholars seem to disagree on its merits. For instance, Jerome and Barbetta (2015) note that the opinions by students in the approach of education are important since it determines the likelihood of success, which is more important than the actual plan used.

On the other hand, Caner and Sart (2015) asserted that active learning methods are more quantifiable as compared to passive learning approaches. Mach and Saldaña (2018) reported that there were no beneficial gains for students to be involved in an active learning environment especially in situations where the lessons are technical or require a specific technique. The two scholar note that in such circumstances, the tutor has to take charge since there is no explorable means of addressing the learning problem, spare the outlined method.

Resultantly, learners' opinion or contribution in such a case has little or no impact. The argument is further backed up by Börkan, Ünlühisarcıklı, Caner, and Sart (2015) who argue that not all the support by the learner in active learning is compelling. Regardless of the differing views of the problem, Karpicke and Grimaldi (2016) state that there is plenty of empirical evidence that backs up the approach. Sagsan, Subasi, and Gürhan's

(2018) review of literature pointed out that students expressed better attitudes as well as increased levels of critical thinking and writing in situations the tutors employed active learning approaches. Börkan et al.'s (2015) review showed that although there were varying strengths in varying teaching approaches, evidence points to the fact that the primary methods of teaching in higher learning institutions remain the traditional lecturing approach. Mourshed et al. (2013), however, advises the lectures and faculties who do not apply any of the active learning approaches to consider the strategy in future citing its well-spelled-out benefits to the learner. Mach and Saldaña (2018) go ahead to suggest the following concerning active learning.

Lectures

Karpicke and Grimaldi (2016) find lectures to be the purest forms of teaching through which a traditional educator can begin incorporating active learning concepts in the classroom. Persky, Dupuis, and Pharm (2014) say that this is achievable by the educator taking occasional breaks from continuous teaching to allow the students to interact with the study material and with each other as well. A preferable method of engagement during such breaks is dividing the students into small groups to facilitate the effective sharing of knowledge. Further, Baskan and Ayda (2018) identify the breaks as necessary in that they enable the student to retain the concepts learned. The fact that students' attention tends to decrease with increased periods of attentiveness further necessitates the pauses. Acer and Güçlü (2017) say breaks help to start the learning process anew besides its ability to keep the student focused. For better outcomes when incorporating active learning to lectures, Ng, Pinto, and Williams (2011) suggest that the faculties and the lecturer should consider online classroom platforms through which the students can access the study material beforehand, with the class time used for reflection and small group engagement. A study by Baskan and Ayda (2018) identified that students who engaged in lectures in recorded PowerPoint video presentations felt that the session should not last more than twenty minutes for maximum intake of concepts by the students. In other instances, the students are advised to engage with each other, the lecturer or the learning material at their own pace in open-

ended sections where they can comment as part of the post-course survey. The in-class time is therefore used to build a conceptual framework as well as elicit varied views from their peers and the educator as well to demystify their misconceptions of the topic of study.

Peer Reviews

Hwang, Shao-Chen, and Chen (2018) define peer reviewing method of study as a process in which the students actively engage in the assessment of each other's work in an informative manner. Sagsan, Subasi, and Gürhan (2018) indented peer reviewing as an exercise that would keep students focused and more attentive in class while at the same time offering makes up for any concept the students might have missed during active engagement with the educator. According to Kiviniemi (2014), this method is most appropriate for teacher training courses like the Early Childhood Teaching programs. The technique turns the class into a team atmosphere through fostering the best practices of exchanging knowledge. Persky, Dupuis, and Pharm (2014) assert that peer reviewing exercises are the best opportunities for learners to get feedback from one another as well as get the highlights of areas where they need to improve. Karpicke and Grimaldi (2016) consider the peer reviewing learning technique as an active and versatile tool of learning that is crucial in fields which emphasize the need for the student to develop higher levels of thinking and collaboration skills.

Multiple other scholars are equally enthusiastic about the use of the peer reviewing learning technique. According to Ela (2013), through peer review, students learn and begin to appreciate other sources of information apart from the educator or the required reading material. Students tend to be more favorable to revise their work in events peers review their writing as compared to self-review.

Games

Games played in classrooms should not be taken for a mere form of entertainment, but rather a useful active learning tool. Alvarez-Bell, Wirtz, and Bian (2017) define educational games as exercises presided over by precise

rules and regulations, and they involve varying degrees of chance in which the players are competing through the employment of the knowledge and skills gained in class as a way of promoting critical thinking, collaboration, and reasoning, while enhancing student-centered thinking on the other hand. Games have the advantage of offering immediate feedback (Yüksel, 2013). However, Wan, Cheung, and Chan (2017) assert that there is a need for adequate preparation for classroom games so that the aim and objectives of the session are met.

Methodology

Research Design

The study adopts a case study design, which involves investigating the phenomenon in a narrowed and specific population. In this research, the population is narrowed down to selected Cukurova University. Hence, the study will be based on the case in Cukurova University. The case study design is appropriate for this study since it is flexible and focuses on the reality within a specified case or population. Besides, the design is highly simplified since the population is not sparsely populated; this eliminates the additional costs of research such as transportation and time. According to Ridder (2017), case studies can focus on groups, individuals, organizations, events, an anomaly or a problem. Besides, when conducting a case study, the researcher can delve in-depth with regards to the aspect considered. Similarly, case studies offer a variety of sources from which to obtain information for analysis. Therefore, through focusing on the case of relationship between active learning strategies and the performance of students in higher learning institutions., sufficient data will be gathered.

Participants

The participants were 305 students of Turkish origin chosen from the Çukurova University in Adana, Turkey currently undertaking Introductory Psychology, Statistics, and Cognitive Psychology courses. The sample size from each session was n=172, n=87 and n=46 respectively for each course. The criterion sampling method, among the purposeful sampling

methods, was used in determining the participants. The purposeful sampling method is defined as a method designed to deepen understanding of the experiences of selected individuals or groups or to develop a theory or approach (Devers & Frankel, 2000). The students were taught by a single instructor for the entire semester. No assistant instructors were involved in the teaching process. For the ten classes, the instructions engaged the students between the fall/autumn 2017 and summer 2018 semesters. No credits were awarded for the students for taking part in completing the survey.

Ethical Concerns, Reliability and Validity

All the respondents in the study were minors, below 18 years of age. As such, informed consent was sought from the parents and guardians via a written consent form. Surveys were done anonymously as a respect for confidentiality. For authenticity, an introduction letter from the university was issued to all surveyors.

Procedure

During the exercise, the scholars were asked to make a list of fifteen things they could remember taught from class over the period under study on their last day of attending classes. The students were free to report anything that they could remember from the course 'without the need to edit their thinking." The sheet on which the responses were written contained fifteen blank spaces for the students to fill in. For the sake of controlling demand characteristics, the survey was conducted on anonymity basis.

Coding

To gauge the extent to which the students could remember the concepts learned in class, the responses were grouped under three major categories:
1. *Irrelevant:* this was in case the student could not refer to any concept learned from class; in other words, the answer provided is entirely wrong. Reference to a video or activity is made, but the student fails to identify the concept illustrated by such features.

2. *Low/medium:* the student can refer to a specific learning concept from the course content. However, the material is mentioned in general terms or an incomplete manner.

3. *High:* the student demonstrates an understanding of the right concept, placed within the proper context. If video or activity is mentioned, the idea being illustrated by such items is referenced.

All the responses by the students were coded on parameters such as understanding levels and frequencies expressed by students accumulated for the semesters for each course and across each category of interest. For the sake of differentiating concepts from the Cognitive and Introductory Psychology courses, the ideas were categorized based on activity types (learning exercises conducted in or out of class, videos, and lectures) and chapters respectively. The "activities" section comprised of learning concepts learned by either filling in worksheets, in- and out-of-class activities and other hands-on experiences such as probability and M&Ms learning skills. The 'videos" category contained viewing recorded video clips from various media aimed at teaching a certain concept such as "They Catch You and You Fall". For any other concept that did not lie under the videos and activities categories, the study grouped them under the "others" category such as the basic distribution error method of learning.

Results/Findings

The results/findings of the study were tabulated and additional explanation of the same offered. Five of the most remembered items for each of the courses are represented in Table 1. Description of the items under each class is discussed separately.

Table 1 shows a high recall rate for concepts introduced through activity-based learning as depicted by the high percentages of remembrance in all three courses. Video presentations and other methods were the second and third most preferable methods in that order as shown in the results in the table. SPSS, activity-based learning recorded the highest remembrance rate (76%), while functionality and roles of the brain registered the least recall rate (24%). Generally, the rates were dispersed within a range of 50%. This data represented a typical skewed performance by the students.

Table 1. Five of the most remembered concepts in each course

Course	Rating	Activity	% of student who remembered
Introductory Psychology (n=172)	1	Classical conditioning with candy (A)	48
	2	Freud, e.g. Ego, id, superego, etc. (A,V,O)	38
	3	Understanding the human nervous system (A)	30
	4	Using virtual reality in therapy (V)	29
	5	Functionality and roles of the brain (A)	24
Statistics (n=46)	1	SPSS (A)	76
	2	Probability (theory and application) (A)	69
	3	Standard deviation (A)	57
	4	Z-activities (A)	49
	5	ANOVA tests (A, O)	43
Cognitive Psychology (N=87)	1	Amnesia, e.g. Clive Wearing, memento (V)	73
	2	Bilinguistic/linguistic development (V)	58
	3	Activities carried out by human memory (A)	53
	4	Mnemonics (A)	38
	5	Stroop effect (A)	33

Key: *A- Activity O- Others V- Video*

Introductory psychology

As shown in Table 2, out of a total of 1289 responses, the students recalled 191 different class based concepts (M=8.97, SD= 0.28) within the course content hence eligible for the study.

Table 2: Recall rates by chapters in introductory psychology learned through activities and videos (n=140)

Chapter	% Total response	% Activities	% Videos
Biological causes of behavior	14.85	73.8	7.99
Psychological disorder	14.90	24.89	62.00
Personality theory	13.9	78.35	21.09
Learning	9.24	76.12	2.03
Human development across the lifespan	8.10	24.75	17.01
Human memory	8.34	4.87	89.02
Social behavior	6.98	85.09	11

Of all the replies, 48.1 percent were concepts related to activities, 20.07 percent were related to videos, while others comprised of 31.83 percent as shown above. Extraneous items outside the study were removed from the survey including black/whiteboards, quiz bowls, ice-breakers etc. leaving

the researcher with 45.97 percent of responses related to activities, 23.98 related to videos, and 30.05 related to lectures.

Introductory statistics

As depicted in Table 3, out of 453 responses, 83 different concepts relative to the study were identified (M=8.67, SD= 0.12). Application of various concepts was the center of focus of the course. Scholars were not intro-duced to Statistical Package for Social Sciences (SPSS) in the first week. However, all other concepts were presented with a trivial exercise involv-ing the preparation of a notebook with the assistance of the instructor. As such, the responses, in this case, were categorized regarding the themes of various methods as opposed to categorization by chapter. Table 1 records the five most remembered concepts while the percentage of responses for the multiple items in Table 3. However, teaching-related answers like food, methods etc. were eliminated.

Table 3. Response rates in introductory statistics (N=89)

Themes	% Total response
Applications	24.88
In- and out-of-class activities	21.09
Data analysis	17.99
Standard deviation	9.45
ANOVA	6.89
Correlations	6.90
Probability	5.87
Hypothesis testing	4.57
Chi-square	2.68

The students mentioned various activities including SPSS (n=45), demonstrating probability using M& Ms (n=21), and videos and Power-Point presentations used to explain probability and proportions (n=18). Generally, responses related to concepts learned through activities amounted to 64.60 percent, while lecture materials made up a total of 35.40 percent. Thoughts resonating from video clips made by the students to determine their prowess in all content were classified as activities and not videos.

Cognitive psychology

A total of 607 concepts were remembered for this course, out of which 129 turned out valid as per the criteria of study (M=8.97, SD=0.34). The five most recognized ideas are shown in Table 1, while Table 4 shows the percentages of individual responses for the various chapters in the course.

Table 4. Response rate in cognitive psychology by chapters (N=154)

Theme	% Total Responses
Problem-solving	45.90
Language	12.85
Memory	8.09
Perception	6.98
Reasoning	5.01
History	3.10
Visual Imagery	2.34
Gender differences	2.48
Basic processing	2.09

For ease of study, the sections on retrieving memories, forming new memory traces, and general knowledge memories were combined. Memento video clip was adversely remembered under the chapter on memory (24.8 percent), or the video depicting Clive Wearing's amnesia (11.9 percent), while mnemonics recorded a 10.89 percent (for instance implicit, explicit and autobiographical etc.). General teachings were then eliminated to remain with a 56.80 percent of the concepts related to activities, 31.09 percent related to videos, and 13.1 percent of the concepts remembered from the lectures.

Across courses

According to Figure 1, students exhibited low/medium remembrance of concepts taught across all the three classes. Introductory Psychology recorded the highest percentage of low remembrance of 54.5 percent, Statistics 44.2 percent and Cognitive Psychology at 27.1 percent. Cognitive Psychology had the highest rate of foreign concepts remembered (41.2 percent), Statistics (18.3 percent) and Introductory Psychology (14.5 percent).
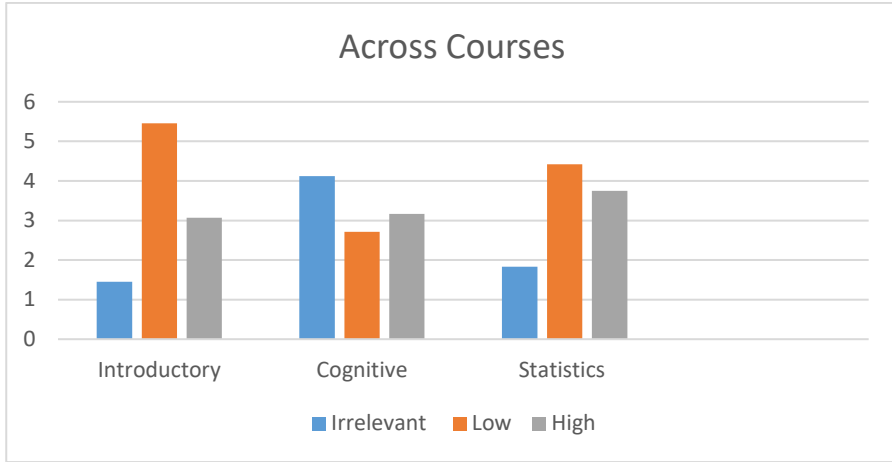
Figure 1. Across courses comparisons based on codes

General Discussion

Many studies conducted on active learning methods have proved their positive impacts on students' learning abilities. Active learning activities contribute to higher recall rate of concepts taught in class as shown by research findings. Active learning is closely associated with the engraving of concepts on the learner's mind since the learner does not only perceive the topic but interacts with it. Freeman et al. (2014) identify that allowing the learner to be in charge of the learning process, active learning provokes creativity and intuition from the learner. Cooper, Downing, and Brownell (2018) argued that active learning integrates acquired knowledge into the existing knowledge base, i.e. personally acquired knowledge, a factor which tends to make it more memorable. Cooper, Downing, and Brownell (2018) refer to active learning as processing information at deeper levels, and it requires close attention and focuses on the meaning of items, hence the reason behind its popularity among the students in all the three courses as shown in the study.

For technical subjects like SPSS, the tutors tend to engage the students for a short while to introduce a concept. Further, there is a likelihood that the teacher will repeat the idea due to its ambiguous nature, hence the high score (76%) in the five of the most remembered concepts in Table 1.

The extended timeframe for encoding the information is highly attributable to the high recall rate of technical concepts.

As for video presentation and clip viewing, Amasyalı (2013) notes that the students may get carried away by the scenes in as much as most of the films made for learning are not much appealing. However, the audio-visual aspect of the video clips enables the students to engage more of their senses (seeing and hearing) at a go than in passive learning concepts, hence the second tier position achieved by this technique in the study. Finally, other teaching techniques mostly yield monotony on the part of the student. Freeman et al. (2014) note that there is a reduced likelihood that all the concepts are understood. This partially explains the last position occupied by other teaching methods in the study. Only a single sense and aspect of reasoning is employed under passive teaching methods. Acer and Güçlü (2017) note that there is a high likelihood of derailment and distraction on the student, which can lead to loss of precious time and concepts.

Conclusion

Active learning is and remains the way to go for the Turkish education system. Whether the Ministry of National Education (MoNE) decides to retain the Eastern view within the field or adopt the Western one, active learning has to be incorporated in the teaching methods employed by the teachers at all levels of learning in higher learning institutions. As such, the use of teaching techniques like group discussions, PowerPoint presentations by students, watching films and later reflecting on them, or even performing experiments in the laboratory are sure and recommendable ways to engage the university students in Turkey in addressing the evident low or irrelevant remembrance levels by the students.

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