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STUDENTS' PREFERENCES AND OPINIONS ON DESIGN OF A MOBILE MARKETING EDUCATION APPLICATION

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ABSTRACT

The purpose of this study was to define and better understand business school students' opinions and preferences on the design of a mobile marketing education application. To accomplish this purpose an explanatory mixed methods study design was used and the data was collected sequentially. First, a questionnaire was conducted with 168 business school students from Anadolu University to define their learning styles. The learning orientation questionnaire produced five factors: visual, auditory, dependent, collaborative, and reading & writing learning styles. In the second phase of the study, semi-structured in depth interviews were conducted with nine graduate students at Anadolu University to better understand their preferences and explore their opinions on the mobile application. After the coding process three themes emerged: learning styles, content, and tools. Added to these themes, eight motives for the use of a mobile marketing education application were also identified.

Keywords: **Marketing education, learning styles, mobile learning, mobile applications, mobile learning design**

INTRODUCTION

The authors of this article have explored students' learning styles and better understand their opinions on the design and use of a mobile application for marketing education in higher education. Firstly, learning styles of undergraduate students taking a credit-bearing face-to-face marketing course on marketing principles were investigated. Secondly, their opinions on design of mobile applications for marketing education were explored. Finally, their views on how to use them effectively in higher education were examined. All results of this study were used in the designing of a mobile marketing education application named as "Marketing Genius".

Today, instructors experience the effects of technological changes in both marketing education and practice. Academic programs and teaching methods are both being redesigned to reflect these changes in both the practice of marketing and the use of technology for marketing education (Clarke III and Flaherty, 2002; Lowe and Laffey, 2011; Santandreu and Shurden, 2012). Mobile learning is one of the methods that came into play.

Mobile learning can be defined as "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies (O'Malley et al., 2005). Mobile learning also refers learning across multiple contexts, through social and content interactions, using personal electronic devices (Crompton, 2013). Mobile learning has the potential to meet the new requirements for effective teaching and enhance marketing courses for students.

According to the Electronic Communication Report published by the Information and Communication Technologies Authority in Turkey in the second quarter of 2013 (ICTA, 2013), the number of mobile subscribers reached 68 million with a penetration rate of 89.8% in Turkey. Compared to the same quarter of 2012, 3G subscriptions have increased 37% in 2013 and the number of 3G subscribers reached up to 45.3 million (ICTA, 2013). Further, the smartphone penetration rate reached 14% in 2012 (Acar, 2013). It is estimated that Internet-capable mobile devices and Internet usage on mobile devices will outnumber computers within few years (Johnson et al., 2011, Ozdamar Keskin & Metcalf, 2011). More people than ever before are feeling the impact of mobile in Turkey as every other part of the globe. In this respect, Turkish universities have been steadily building mobile learning capacity and Turkey affords a rich variety of commercial and research challenges and possibilities along with the research and academic resources to explore them (Ozdamar-Keskin et al., 2012).

Development of mobile learning research characterized by three general phases: a focus upon devices, a focus on learning outside the classroom, a focus on the mobility of the learner (Cochrane, 2013; Cook, 2009). There has been still a flurry of m-learning research and case studies in this field (Cochrane, 2013; Frogberg, Goth & Schwabe, 2009). For example, there are little studies with focus upon sustainable integration of mobile learning into formal education contexts (Cochrane, 2013). Also, there is an urgent research need to develop unique approaches that can form the base of new mobile application for teaching and learning in higher education (Khaddage & Latteman, 2013). Mobile applications embody the convergence of several technologies that lend themselves to educational use, including annotation tools, applications for creation and composition, and social networking tools (Johnson, Adams & Cummins, 2012). Mobile applications have grown tremendously in recent years and the market is moving rapidly and spreading globally. Despite these rapid developments in mobile apps and devices, universities have yet to formally acknowledge and integrate mobile applications for teaching and learning (Khaddage & Latteman, 2013). The authors believe a significant need to investigate how to design mobile learning applications and how to use it effectively in higher education.

LEARNING STYLES

We need to identify and better understand students' learning preferences to achieve effective and appealing mobile learning application design and to offer learners more personalized, supportive solutions, and active learning opportunities. The idea of learning styles originated in the 1970s, and has greatly influenced education, and still continues today.

But the literature on learning styles is fragmentary and there are different streams of research in this field (Coffield, Moseley, Hall & Ecclestone, 2004). This fragmentation and competing ideas also have led to confusion in the terminology of learning styles research (Simsek, 2004; Karadeniz, 2008).

The term "learning styles" refers to the view that different people learn information in different ways. In other words, it refers to the concept that individuals differ in regard to what mode of instruction or study is most effective for them (Pashler, McDaniel, Rohrer & Bjork, 2008, p.105). There are a number of different learning style models in the literature. Some of most popular learning-style schemes include the Dunn and Dunn learning-styles, 1974 (environment, emotionality, sociological preferences, physiological characteristics, psychological process inclinations), Kolb's Learning Styles Model, 1976 (concrete experience, reflective observation, abstract conceptualization, and active experimentation), Felder and Silverman Learning Style Theory, 1988 (sensing learners or intuitive learners, visual learners or verbal learners, active learners or reflective learners, sequential learners or global learners).

Curry (1983) is one of the most cited literature reviews of the psychometric qualities of different learning styles instruments. Curry (1983) categorized different research approaches in three layers. These were: 'instructional preferences', 'information processing style' and 'cognitive style'. Instructional preference refers to the individuals' choice or environment in which to learn. The second level of the learning style onion was called Information Processing Style. This is conceived of as the individual's intellectual approach to assimilating information following the information-processing model. The third and innermost layer is Cognitive Personality Style. This is defined as the individual's approach to adapting and assimilating information; but this adaptation does not interact directly with the environment, rather this is an underlying and relatively permanent personality dimension (Curry, 1983). Hunt, Eagle and Kitchen (2004), chose a "slice of the onion" approach, taking from each layer a selection of learning characteristics to create a more holistic picture of the student's learning behavior. They have called this mix of aptitudes, styles, and approaches as learning orientations.

In this study, we have chosen some parts of this learning orientation questionnaire constituting both cognitive and information processing styles that will utilize our research objectives and clarified them according to Fleming and Mills's VARK Model and Grasha and Reichmann's Learning Style Model.

Fleming and Mills's VARK Model (1992) refers four learning style dimension (http://www.vark-learn.com/english/page.asp?p=categories).

- **Visual learning style: This preference includes the depiction of information in maps, diagrams, charts, graphs, flow charts, labeled diagrams, and all the symbolic arrows, circles, hierarchies and other devices, that people use to represent what could have been presented in words.**
- **Auditory learning style: This perceptual mode describes a preference for information that is "heard or spoken."**
- **Reading-writing learning style: This preference is for information displayed as words. Learning materials that are primarily text-based are strongly preferred by these learners.**
- **Kinesthetic learning style: This modality refers to the perceptual preference related to the use of experience and practice (simulated or real).**

Grasha and Reichmann's Learning Style Model (1996) moves from learning styles to learning approaches, strategies, orientations and conceptions of learning (Coffield et all, 2004) and classifies learning styles by three dimensions and six learning styles (http://academic.cuesta.edu/wholehealth/disted/about_styles.htm).

- ***Avoidant or Participant Learning styles***: **Avoidant students are not enthusiastic about learning content and attending class. They are slow to participate with students and teachers in the classroom. They are uninterested and often overwhelmed by what goes on in class. On the other hand, participant students enjoy going to class and take part in as much of the course activities as possible. They are typically eager to do as much as they required and optional course requirements as they can.**
- ***Competitive or Collaborative learning styles***: **Competitive students who learn material in order to perform better than others in the class, and believe they must compete with other students in a course for the rewards that are offered. On the other hand, collaborative students enjoy working harmoniously with their peers. They can learn by sharing ideas and talents.**
- ***Dependent or independent learning styles***: **Dependent students show little intellectual curiosity and who learn only what is required. View teacher and peers as sources of structure and support and look to authority figures for specific guidelines on what to do. On the other hand, independent student who like to think for themselves and are confident in their learning abilities. They prefer to learn the content that they feel is important and would prefer to work alone on course projects that with other students.**

There are a few studies that have concentrated on matching styles with mobile technologies to enhance students' learning experiences although mobile learning has potential for providing a mechanism where each learner will have their own individualised learning process (Kinshuk, 2004; Yau & Joy, 2006). In the mobile learning literature, there are some models and maps for mobile learning environments based different learning styles models. For example, Yau and Joy (2006) have suggested the Dunn and Dunn Learning style model as the most appropriate learning style model for mobile learning environment, Kinshuk (2004) presented a content model for multi-platform environment based on Filder and Silverman Learning Style theory and also Shariffudin, Julia-Guan, Mislan and Lee (2012) developed a mobile learning environment model for distance education students' different learning preferences based on Myers-Briggs type indicator.

However, there is a gap in mobile learning research on how learning styles can be incorporated into different learning scenarios facilitated by mobile devices. Educators rethink how learning happens and how specific learning needs and styles are expanded and enabled with mobile devices (Shariffudin et all, 2012).

METHODOLOGY

An explanatory mixed methods study design (also called a two-phase model) was used in which data was collected in two phases sequentially. The explanatory mixed methods design consists of first collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results (Creswell, 2008).

Thus, a questionnaire was conducted with 168 business school students from Anadolu University that took the Principles of Marketing course in the summer term of 2012 in the first phase of the study.

The questionnaire was developed with 16 items designed to measure students' learning orientations mainly referred from the research of Hunt, Eagle and Kitchen (2004). A four-point Likert Scale with strongly agree; agree; disagree; and strongly disagree, was used for the main items.

Table: 1
Demographic Characteristics of the Participants (N=168)

Characteristic	%	Characteristic	%
Sex		***Department***	
Male	51	Department of Public Finanace	3
Female	49	Department of Economics	4
		Department of Business	88
Age		Administration	5
		Other	
18-20	10	***Grade***	
21-25	88	First year	2
26-35	2	Second year	17
		Third year	34
		Fourth year	40
		More than four yars	7

Respondents of the survey were undergraduate students (85 men and 83 women), ages ranging from 18-26 from different departments (Business Administration, Economics and Public Finance).

The demographic characteristics of the participants are shown in Table 1. The data of this study was gathered using a paper and pencil data collection method. The Learning Orientations (16) measures were then subject to exploratory principal components analysis (PCA). An orthogonal rotation with varimax was chosen. Following the results of the factor loadings, means, standard deviations, and Cronbach's alpha were computed for each factor (See Table 2).

In the second phase of the study, semi-structured in-depth interviews were conducted to better understand their learning preferences on marketing courses and explore views of students on different characteristics of the mobile application such as level of interactivity, relationship to real world experience, amount of time involved, level of personal importance or relevance, interaction with the instructor, organization of knowledge, and feedback on performance while learning. Interviews were conducted with 9 undergraduate students at Anadolu University.

All participants were business majors and taking the Principles of Marketing course, 4 female and 5 male, ranging in age from 20 to 25.

A semi-structured interview format was followed in the conducting of the interviews and discussion was focused on four themes: their learning orientations/preferences in marketing courses, presentation of the content/knowledge in mobile applications, which digital tools can be embedded and finally what motivates them to use this kind of mobile application. All interviews conducted face-to-face were recorded with the permission of the students and subsequently transcribed.

A coding process was employed that combined deductive and inductive components. The deductive component consisted of coding the interview data using the factors identified from the factor analysis and literature review. The inductive component consisted of coding the data for emergent themes.

Then all the codes were re-categorized under major themes and the relationships between these themes were examined. QSR NVivo8 was used in the qualitative data analysis.

RESEARCH FINDINGS AND DISCUSSIONS

Learning Styles

'The learning orientation questionnaire' (Hunt, Eagle and Kitchen, 2004) produced five factors based on the factor analysis with eigenvalues greater than 1.0, explaining 57% of the variance (see Table 2).

Table: 2
Factor Loadings (Principal Components, Varimax Rotation) of Learning Orientation Questionaire (N=168)

Items	M	SD	Factors				
			1	2	3	4	5
Visual learning style							
I prefer to get new information in pictures, diagrams, graphs, or maps rather than written or spoken information.	3,06	,72	,792				
I remember best when I see in pictures or graphs rather than what I hear or read.	2,97	,78	,746				
I like using games and simulations in learning.	3,17	,76	,718				
I make simple charts, diagrams, or tables to summarize material in my course.	2,84	,78	,604				
Auditory learning style							
I prefer listening to reading.	2,65	,80		,865			
I understand better if someone explains it rather than reading about it.	2,77	,82		,736			
I remember best what I hear rather than what I see.	2,23	,78		,495			
I prefer listening to the lecturer more than reading the study guide.	3,09	,78		,489			
Dependent learning style							
I prefer working face to face.	3,20	,60			,832		
I prefer working with an expert.	3,27	,65			,820		
Collaborative learning style							
I prefer working independently.	3,23	,83				,663	
I prefer working in a team or with a partner.	2,93	1,76				,650	
I watch and learn from other people.	2,72	,73				,557	
Reading & writing learning style							
I find a written version of the key points of a lecture much more useful than a diagram or oral summary.	2,81	,88					,768
Eigenvalue			2,680	1,828	1,609	1,267	1,159
Variance Explained (%)			19,145	13,059	11,491	9,047	8,278
Cronbach Alfa			,699	,596	,672	,314	-

"I prefer working independently" is a reverse coded item.

'The learning orientation questionnaire' (Hunt, Eagle and Kitchen, 2004) produced five factors based on the factor analysis with eigenvalues greater than 1.0, explaining 57% of the variance (see Table 2). Factor 1, *visual learning style* comprises four items that measure the preference of using diagrams and pictures when getting new information. These students prefer visual format than either written or spoken information (Fleming and Mills, 1992; Hunt, Eagle and Kitchen, 2004). Learners who have a high visual preference are more proficient at decoding information that is imaged-based, for example pictures, diagrams and charts (Jeffrey, 2009). The eigenvalue is 2,68 and the factor explains 19% of the total variance.

The key items in this factor are "using games and simulations in learning (M=3,17 and SD=0,76)" and "prefer to get new information in pictures, diagrams, graphs, or maps rather than written or spoken information" (M=3,06 and SD=0,72)". This finding is supported by the study of Baldwin and Sabry (2003) that found a stronger preference for visual learning (82%) than verbal (18%) amongst students. Factor 2, *auditory learning style,* comprises four items that measure the preference of listening the lecturer than read about them in study guides or textbooks (Fleming and Mills, 1992; Hunt, Eagle and Kitchen, 2004), (eigenvalue = 1,8, variance explained = 13%).

Verbal (via auditory working memory) and visual information (processes via the visual memory) is processed in different parts of the working memory (Jeffrey, 2009). Thus, auditory learning style requires different skills and abilities. *Dependent learning style* was the third factor identified (eigenvalue = 1,6 variance explained = 15%) and consists of two items that measure the preference of studying face-to-face and with an expert. In this style students understand education to be about finding the "right answer" and this information is seen to be held by the lecturer (Grasha and Reichmann, 1996; Hunt, Eagle and Kitchen, 2004). The mean for these items was high (M=3,20 and 3,27), suggesting that these represented important preferences obtained by students. As Sadler-Smith and Riding (1999) study, traditional teaching modes do little to prepare students for independence, and most of the students have shown a preference for traditional teaching modes.

Factor 4, *collaborative learning style* (eigenvalue = 1.27, variance explained = 9%), includes four items that measure the preference of working collaboratively rather than alone (Grasha and Reichmann, 1996). *Reading-writing learning style* was the fifth and the last factor (eigenvalue = 1.16, variance explained =8%) and encompasses two items that measure the students' preference of written materials than diagrams or what is spoken (Fleming and Mills, 1992). Relatively few students prefer written materials in their learning orientations. In fact, Jeffrey (2009) argues that images and text are both decoded in the visual working memory but require different processing strategies. Thus, differences in the ability of students to use these strategies may account for different preferences for text or images. Also, poor readers struggle to extract meaning and information from written materials.

Findings from Interviews

We identified three major themes according to the preferences and opinions of the students on the design of a mobile application on marketing education. These were

- **learning styles,**
- **content and**
- **tools. Figure: 1 illustrates the scope of each theme and also how these four themes are related to each other.**

Learning styles refer to the students' learning orientations/preferences and preferred mode of teaching. Four sub-categories composed learning styles theme: participant, visual, dependent, and competitive.

Participant learning style refers to the students' active participation in the learning process and learning by experiences (Grasha and Reichmann, 1996). Students mentioned that they remember better from their experiences and enjoy being active much more. We also asked students how we could add participation in this application. Three recommendations were brought.

Tasks, games and contest were seen to enhance their experience and also participation. They offered that some tasks related to the course could be given to the students. These tasks may contain finding something (a brand, product, a retail store, etc.) that answers a question or engages in an activity or facility such as visiting a retail store and narrating the story of this visit taking into account the sales course.

They indicated that these kinds of experiences allow them both to have fun as well as learn. The other two recommendations were related to game-based learning. Students' quests for fun in all areas of life also make them seek "entertainment" in education. Thus, they think that games especially simulations and puzzles or contests may enhance their education experience and participation in the courses.

According to VARK Model, visual learning style refers learning more easily with diagrams and pictures. Students mentioned that visual presentation of knowledge help them better understand new information and also make learning process less tedious. Long texts either intimidate or get bored of them. Mostly they prefer visual educational aids as they make it easier to remember new information.

All of the students prefer an organized and well-structured course. These students want clear guidelines and transparency in the process. They need to be guided. They are not self-directed learners.

Thus, we can say that they have a dependent learning style. Dependent learning refers to an expert guided course preference. Students who prefer dependent learning think that education is finding the "right answer" and this information is seen to be held by the lecturer (Grasha and Reichmann, 1996; Hunt, Eagle and Kitchen, 2004). The education system in Turkey is mostly based on test-based exams and our students unfortunately do not need to explore alternative views. In accordance with the results of our survey, our participants think that dependent learning is the best way to learn new information. They said that when they go on the Internet, because of information pollution, it is hard to find the right answers. However, working with an expert in a dependent learning setting, it is both reliable, time saving and easy way to find the right information. These findings support the findings of Sadler-Smith and Riding (1999) and Knowles (1990).

In addition, reaching an expert when needed is also an important issue for our participants. Finally we asked about their opinions on team work. But they have indicated that they would rather work alone. This finding may also be related to competitive learning style as most of our participants believe they must compete with other students in a course for the rewards that are offered (Grasha and Reichmann, 1996).

Videos are mentioned by most of our participants as a way of presenting the content. Most of them are also using their smartphones for watching videos, especially from YouTube and TED Videos. We asked them who should present the content in the video; a lecturer or an expert/professional from the industry.

In accordance with their dependent learning preference, they indicated that a lecturer video is a must; however expert videos can also be added but not necessarily. They also mentioned that videos should not exceed 15-20 minutes as it is hard to download and also they ran out of patience.

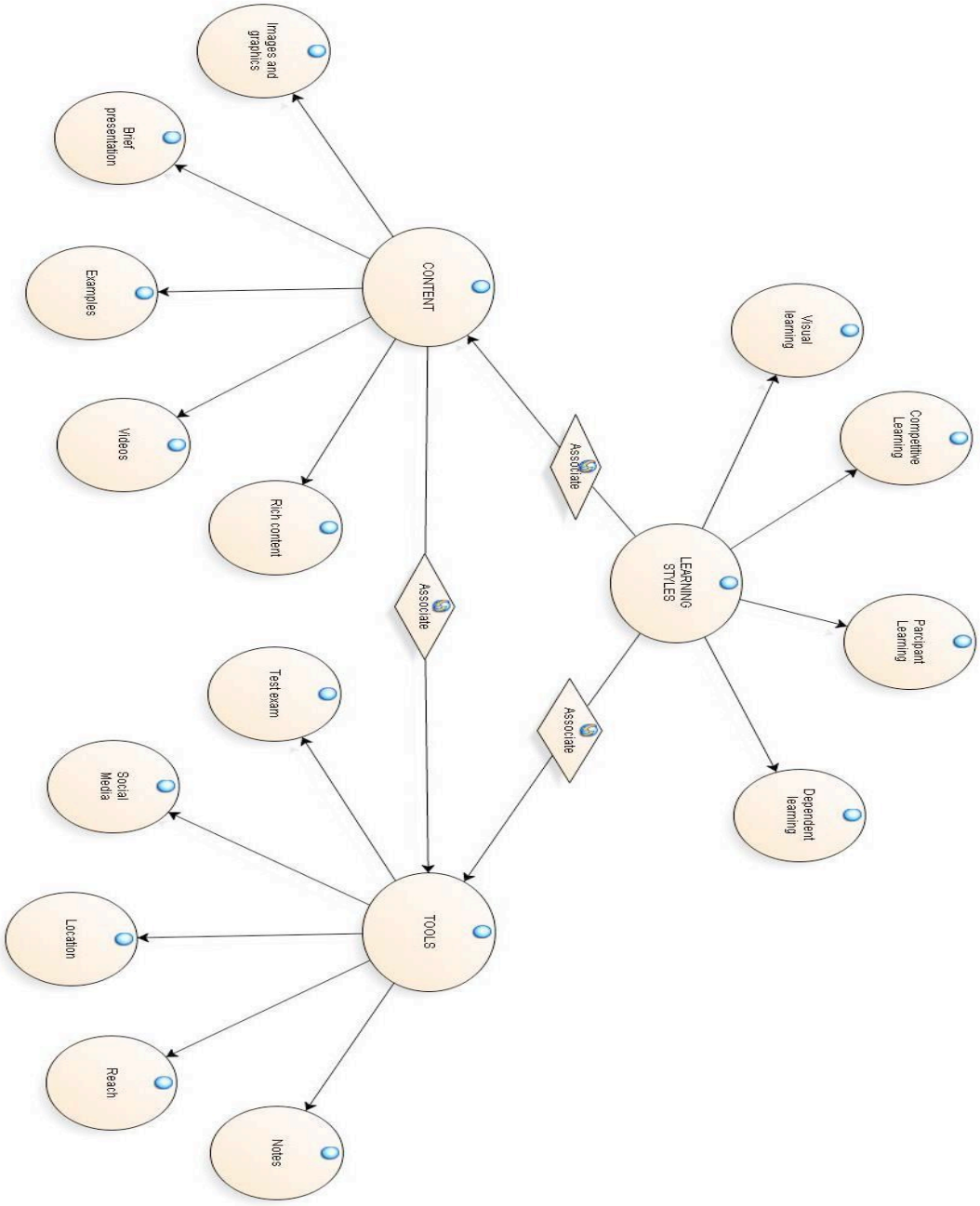

Figure: 1
Preferences in mobile learning

All of the participants mentioned the importance of examples in their learning process. They indicated that they better understand and remember the concepts when they are related to an example. Thus, they think that the content in the application should contain examples from the industry.

Finally, they demand rich content in the application. We asked them what kind of resources they mostly request. Both academic and informal resources were mentioned such as articles, e-books, blogs, web sites, etc. They expressed that the content should be up-to-date, diverse and entertaining.

The third theme explored from the interviews was the digital tools that can be embedded to the mobile marketing application. All the participants agreed among the use of social media in the application. Facebook was the number one social media platform mentioned by the participants, as it is the most common among the students. Even they suggested that the tasks that will be assigned in the application should be related to Facebook in some way. They indicated that the application could be more interactive this way.

Another tool mentioned by our participants was a "test exam." Some of the participants thought that these exams can be used as a contest in the application and this could be fun. On the other hand, some of them said that these exams could give feedback about their learning and will increase their motivation.

They also mentioned a tool for reaching the instructor/lecturer is critical. One of the participants told that he e-mails many of his lecturers but none of them responded. He said "to be considered is very important for me in my learning process" and this kind of a tool may guarantee the lecturer will respond. Location tools are also mentioned but the participants could not relate how it will enhance their learning experience. At last one of the participants suggested a notes page that can be added to the application to take notes when using the application.

All the themes shown in Figure: 1 are quite relevant with each other. The learning styles of the students directly affect both their preferences on the presentation of the content and the tools they require in the application. The content preferences also affect their tool requirements.

Motives for The Use of A Mobile Application in Marketing Education

We asked our participants what motivates them to use this kind of a mobile application (See Figure 2).

Different themes emerged from the interviews. Up-to-dateness was the most highlighted element. Our participants indicated that if the application updates frequently, they would use this application more often.

We asked how could we keep our application up to date? They suggest adding social media tools such as Facebook or Twitter, and a place to highlight industry news related to marketing.

Another theme frequently repeated by our participants was interactivity. Our participants emphasized two kinds of interactivity; one is human to human interactions as they would like to communicate or interact with the other students that use the application.

The second interactivity type is human to artifact communication such as they would like to receive content in different forms such as text, audio, video, pictures, graphics, etc.

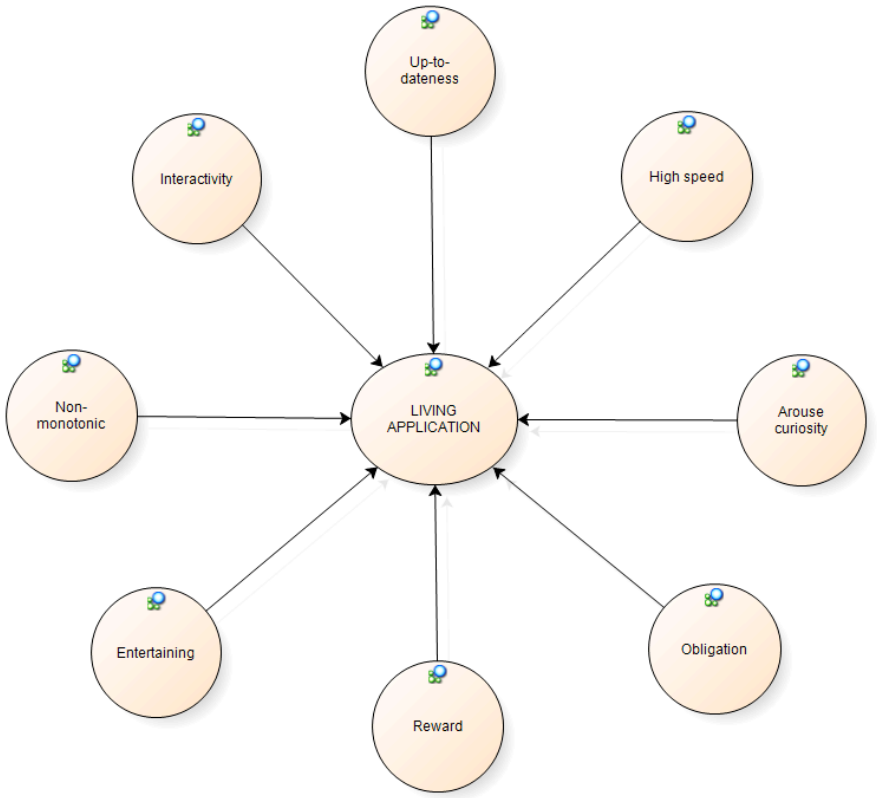

Figure: 2
Motives for the use of a mobile application in marketing education

Our participants emphasized that monotony of the application will alienate them from using this kind of an application and suggested adding rich content to avoid monotony.

Thus, each time they could look at different parts of the content and learn new things about the subject. Entertainment was another element mentioned nearly by each of our participants. They think that up-to-dateness and dynamic application are important aspects but these features do not guarantee fun for them.

Thus, they persistently express that the application should contain some tools for entertainment such as contests, funny examples or photos, and games. Social media is also seen as a tool for entertainment. Some of our participants indicated that the probability of winning a prize (such as a prize competition) or to be rewarded (getting an extra grade from their course) could enhance their motivation to use this application. Moreover; they pointed out that the usage would increase if the application becomes a mandatory implementation in the course. Two of our participants mentioned curiosity. They indicated that it must be intriguing for them to use the application; however they cannot define how curiosity could be added.

At last, speed was found as an inhibitory factor for usage because most of our participants remarked their concern about slow running applications. Nowadays, no one can stand waiting. Thus, the download and usage speeds are very important factors for the use of the application. All the concepts mentioned above such as non-monotonic, up-to-date, entertaining, intriguing refer to a living application. In sum, they would like a "living educational and entertainment application" that is dynamic, interactive, with an information flow that is continuous, fed from different recourses like social media platforms and stimulating the students with new updates.

CONCLUSIONS

This study is limited with three themes including learning styles, content and tools for mobile marketing education design, and six motives which include up-to-dateness, high speed, arousing curiosity, obligation, reward, entertaining, dynamic, interactivity for the use of a mobile application in marketing education. All the findings were interpreted simultaneously and as mentioned earlier, the results were used in the implementation stage of the marketing education application named Marketing Genius. Based on the findings the design related implementations were summarized below:

➢ To keep all the pages simple and brief, the content is presented in modules. For now, only one module is uploaded in the application named "What is marketing?". Written materials are selected as the baseline for our module. But, to avoid long texts the content of the module is also divided into topics such as "marketing definitions, marketing process, needs and wants, exchange etc." and all the topics in the module are presented briefly (less than 1 page for each topic). By this way students will be able to focus on whatever topic they want to. Moreover they can take a break at the end of each topic or module and than go back to study. In Figure 3, sample screen views from the application were shown.

Figure: 3
Sample screen views from the application "Marketing Genius"

➢ In accordance with the students' preference on visual learning style, we add images for each topic and at the end we used a graphic to summarize all the topics in the module. We tried to select funny images to get the attention of the students. In addition, videos are prepared for each topic in the module. Three different lecturers gave information about some concepts related to the topics in the module.

- **In accordance with the students' preference on auditory learning style, each page has an audio version of its content. If the student does not want or have a chance to read the text, he/she could listen to the audio recording.**
- **Sample cases and images are found to give an example of some topics and concepts. Sample case stories are also available as an audio version.**
- **In accordance with their request to gain experience through their learning process, some tasks are assigned in some topics for participant and competitive learners. These tasks comprise finding a brand name, taking photos and giving some examples related to the topic. These tasks also contribute to their quest for fun.**
- **"Consulting" tool on the main page (see Figure 3) allows students especially dependent learners to reach their lecturer any time they want. With a link given in each page of the module, this tool can also be reached when student is working on a module.**
- **A 10-question test exam is added to the application for self-assessment.**
- **The online resources tool includes links of e-books, articles, podcasts and blogs related to the topics. This tool provides accessibility to a wide range of digital content.**
- **The social media tool enables students especially having collaborative learning style to reach the social media pages of the application (Marketing Genus Facebook and Twitter pages). These pages intend to enhance interactivity and entertainment in the application.**
- **Finally, "My Progress" is a follow-up tool that students can monitor both the content and their own learning process (for example, which parts/topics of the module is completed or how many questions the student answered correctly etc.)**

Table: 3
Mobile Learning Preferences and Design Features of the Application

Design features of the application	Learning Styles	Presentation of Content	Motives
Text based modules **Separate topic pages under modules** **Short texts**	Reading-writing learning style Dependent learning style	Brief content	Non-monotonic High speed
Images **Graphics** **Videos**	Visual learning style	Images, graphics and videos	Entertainment Interactivity
Audio records	Auditory learning style	Brief content	Non-monotonic High speed
Examples **Sample cases and images**	Participant learning style	Examples	Up-to-dateness Non-monotonic Entertainment
Assignments	Participant learning style Competitive learning style	Examples	Interactivity Non-monotonic Entertainment Reward Arouse curiosity
Consulting	Dependent learning style	-	Interactivity
Test-exam	Competitive learning style	-	Interactivity Reward
Online resources	Participant learning style	Rich content	Up-to-dateness Arouse curiosity Entertainment
Social media	Participant learning style	Rich content	Interactivity Entertainment
My-progress	Competitive learning style	-	Reward

Table: 3 gives a summary of which design feature correspond to which themes about the students' learning styles, presentation of the content and motives. Since the number of interviewed students was quite limited, the features of the mobile application were mostly designed based on the results of the quantitative study. After the use of the application, more in depth interviews can be conducted with the users to better understand their usage patterns and the usefulness of the application. By this way, both the application could be refined and also more knowledge is obtained on the performance or the quality of the application. On the other hand, this was an exploratory study. In the future, an experimental design could be conducted to compare a traditional, face-to-face setting with a mobile learning environment. Further, further research is needed to explore how to increase interaction and participation in mobile learning in developed applications.

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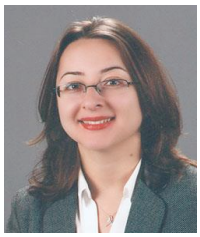

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