Students' Positions Regarding Academic use of Smart Devices

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Abstract

In the era of the information age students grow in a digital environment. Information technologies are entwined in their daily life, never separating. Smart devices such as smartphones, tablets, e-readers and palm computers are devices used by students worldwide for academic purposes. These smart devices have proven their efficiency as instructional tools in the world wide academic environment by enriching and intensifying the learning experience and significantly improving students’ achievements around the world. The present study has two objectives: the first objective is to explore the way students cope when encountering difficulty whilst using a smart device for academic purposes, and to explore their attitudes towards academic use of these devices. The second objective of this research is to identify the connections between the factors that affect the scope of academic use of smart devices. The study was conducted in Israel using the quantitative method; data was collected via survey questionnaires and statistical analyses. The population of subjects included 146 bachelor and master students from two academic institutions. The results indicate that the student’s way of coping was characterized more in a way of problem solving, rather than emotionally. Also it was found that the students’ attitudes towards academic use of smart devices are gender related, with the female students possessing slightly more positive attitudes than the males. The first research hypothesis claimed that those who tend to cope with the problems less emotionally and turned toward problem solving would have more favourable attitudes towards the smart devices and would make more use of them for academic purposes. This hypothesis was not confirmed, rather the findings show just the opposite – those students who handled the problems on a more emotional level tended to show more positive attitudes than those who coped by problem solving. The second research hypothesis stated that the more positive the positions of the students, the greater their preference towards a specific device and the greater the academic use of the device. This hypothesis was confirmed.

Keywords: Attitudes; Way of coping; Smart device preference; Scope of academic use

I. INTRODUCTION

The iPad was first launched in April 2010. A year later, Apple reported the sales of over 28 million devices since the launching day. According to Diemer and his colleagues (Diemer, Fernandez & Streep, 2012), since the launching of the iPad, many universities and colleges have launched iPad initiatives in an effort to enhance student learning. Woodcock and colleagues (Woodcock, Middleton &Nortcliffe, 2012) examined whether students autonomously harness smartphone technology to support their learning and, if so, the nature of this use. They found that students who own smartphones are largely unaware of its potential to support learning and, in general, do not install smartphone applications for this purpose. The students, however, are very interested to be introduced to the academic possibilities which may improve and forward their education. The students noted that, thanks to the internet connection and the speedy access, they use email and check learning material on their smart devices. Furthermore, they would like to have access to more academic content, library catalogues, and university related data, time tables and lecture contents. Ariel and colleagues (Ariel, Avidar, Chen, Levi & Elishar- Malcah, 2012) reported on the importance of the smartphone in the lives of the students. With regard to academia, the interviewees pointed to a number of aspects which illuminate the service the mobile device provides by improving and easing their academic conduct.

II. LITERATURE SURVEY

Morris and Higgins (Morris & Higgins, 2011) reported that the University of Maryland College Park is in the fourth year of a program to investigate the uses, advantages, pitfalls, costs and impacts of mobile devices in the pedagogical and social activities of a major University. The goals of the Mobility Initiative were to: enhance the classroom learning experience, promote interaction between faculty and students, provide students with a tool to help them manage their time and navigate the campus (physical and administrative environments), enhance the personal safety of their students; create an impression about the university’s world class status through innovation and technology.

As reported in their research, the content of existing web pages was reformatted, many educational applications were developed, and wireless access points available to students have tremendously increased usage. They also reported that the students widely used the smart devices for academic use both in and out of the class. Overall feedback in all aspects of the
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III. RESEARCH QUESTIONS

1) What is student's way of coping when facing difficulties while using smart devices for academic purposes?
2) What are the students' attitudes towards using smart devices for academic purposes?

IV. RESEARCH HYPOTHESES

1) The more the coping is characterized by problem solving and less by emotion
   - The more positive the attitudes.
   - The preference for a particular smart device and its' use will be greater.
2) A correlation will be found between the attitudes and the existence of a preference of a particular smart device and its use:
   As the positions are more positive, thus the preference for a specific device will rise as well as its' use.

V. METHODOLOGY

A. Data Collection:

The research was conducted in Israel during the two semesters of the 2012 academic year. The population of subjects included 146 Bachelor and Master Students from two academics institutions: BarIlan University situated in Ramat Gan and the Sami Shamoon College of engineering situated in Ashdod city, Israel. 78 of the participants were male and 68 women. The ages of the participants varied. Validation of the questionnaires was conducted on a sample population of 33 M.A. students in the Department of Information Science Bar Ilan University in the first semester of 2012. These students received iPads at the beginning of the semester and were requested to connect to the App store and iTunes U (an application through which thousands of university from all over the world present academic content) and to download applications at will with a preference to academic applications

B. Data Analysis:

Of the respondents 78 (%53.4) were male and 68 (46.6%) were female. Most (n=61, 41.8%) were 20-25 years old, 49 (33.6%) were 26-30 and 36 (24.7%) were 31+ years old. As for their enrollment by educational level, 100 (68.5%) were undergraduates, 46 (31.5%) were MA students.

C. Measures:

The participants were requested to complete five questionnaires:
- Personal details questionnaire
- Way of coping with difficulties questionnaire
- Attitudes towards academic use of smart device questionnaire
- Smart device preference for academic use questionnaire
- The scope of use of smart device for academic use questionnaire

The way of coping questionnaire consisted of 7 statements rated on a 5-point Likert scale (1=strongest disagreement; 5=strongest agreement). A principal components factor analysis using Varimax rotation with Kaiser Normalization was conducted and the analysis revealed two factors which explained 57% of the variance: emotional and problems solving coping, with five items for emotional way of coping (items 3, 1, 4, 2, 5) Cronbach’s Alpha coefficient was .87, indicating good internal reliability and two items for problems solving (items 6, 7). Significant positive correlation was found between the two factors: \( r=0.41 \), \( p<.001 \).

The attitudes towards academic use of smart device questionnaire, based on Aharony et al. (2014), was modified for this study and consisted of 20 statements rated on a 5-point Likert scale (1=strongest disagreement; 5=strongest agreement). A principal components factor analysis using Varimax rotation with Kaiser Normalization was conducted and explained 56% of the variance. Principle components factor analysis revealed two distinct factors. The first related to positive attitudes (items 17, 16, 7, 3, 15, 1, 18, 9, 20, 6, 13, 19, 11, 14); the second related to negative attitudes (items 10, 5, 12, 4, 8, 2); Cronbach’s Alpha coefficients were .94 and .81, respectively, indicating good internal reliability.

The smart device preference questionnaire explored the preference of smart device for academic use and consisted of five statements. Respondents' scores were aggregated into one measure based on the mean of the item scores. Higher scores indicated higher activity use.

The scope of academic use of smart device questionnaire explored the frequency of the use of the smart devices for academic activities and consisted of five statements rated on a 7-point Likert scale (1= never, 7=several times a day). Respondents' scores were aggregated into one measure based on the mean of the item scores. Higher scores indicated higher activity frequency use. The value of Cronbach’s alpha, a measure of internal consistency, was high .89, indicating good internal reliability thus the higher the score the greater the use.
VI. FINDINGS

The students’ way of coping was examined by two factors: emotional way of coping and problem solving coping. Researchers used SPSS software to analyze data. A MANOVA was performed in order to investigate differences between respondents who cope emotionally or by problems solving. Significant differences were revealed between the two groups: F (1,117) = 33.95, p<.001, Eta²=.23. The findings reveal that the students cope more by problems solving M=3.57, SD=.66 rather than emotionally M = 2.95, SD=.82. Examining the relationship between gender and level of education, variance analysis was conducted 2X2X2 with repeated measures (gender X level of education X way of coping). The test did not reveal any significant difference regarding gender: F (1,117) = 1.01, p>.05. Nor significant differences regarding the level of education: F (1,117) = .30, p>.05. Nor significant differences regarding the age groups F (2,115) = .57, p>.05. However, significant interaction was revealed regarding age X way of coping F (1,117) = 4.62, p<.05, Eta² =.04. Meaning, both groups (20-25 and 26-30) cope in a way of problem solving more than emotionally. However, differences of way of coping (emotionally and problem solving) in the older group (31+) were: F (1, 67) = 55.9, p<.001, Eta² = .45, while the difference in the younger group (20-25 and 26-30) were: F (1,150) = 8.71, p<.01, Eta² = .15. Meaning, the effect (Eta²) in the older age group (31+) is greater than in the younger groups.

Attitudes towards smart device academic use were examined by two factors: positive and negative attitudes. In order to investigate if the students’ attitudes are more positive than negative and if differences exist between gender and age groups, variance analysis was conducted 2X2X2 with repeated measures (gender X age X positive and negative attitudes) The test did not reveal any significant differences regarding the positive and the negative attitudes F(1,120) = .04, p<.05. However, a nearly too significant interaction was revealed between gender and attitudes F (1,120) = 3.54, p=0.6, Eta² = .03. Meaning, male’s attitudes are slightly more negative towards the academic use of smart devices, while female’s attitudes are more positive.

Simple effect analyses comparison between the attitudes was performed for male and female separately reveals no significant differences among the male F (1, 66) = 2.39, p>0.5 nor among the female F (1, 56) = 1.14, p>0.5. Therefore, the significant interaction is a result of a reverse scoring, where the men expressed negative attitudes more than the women. As mentioned, the variance analysis also considered the age groups. No differences were found, not even in age X attitudes. In another variance analysis the differences between the B.A. and M.A. students were examined. In this analysis a significant difference was found between the two groups related to negative attitudes f (1,120) = 4.63, p,.05, Eta²=.04. In other words, B.A. students expressed more negativity towards the use of smart devices for academic purposes M = 3.18, SD = .92 in comparison to the M.A. students M = 2.74, SD = .94

VII. CORRELATION BETWEEN RESEARCH VARIABLES

In order to examine the relationship between research variables: way of coping, attitudes, smart device preference and scope of academic use of smart device researchers performed Pearson correlations which are presented in table 1.

* p<.05  ** p<.01  *** p<.001

<table>
<thead>
<tr>
<th>Way of coping</th>
<th>Positive attitudes</th>
<th>Negative attitudes</th>
<th>Smart device preference</th>
<th>Scope of academic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotionally</td>
<td>.38***</td>
<td>.26***</td>
<td>.03</td>
<td>.12*</td>
</tr>
<tr>
<td>Problem solving</td>
<td>.13</td>
<td>.18*</td>
<td>.00</td>
<td>.04</td>
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</table>

Significant correlations were found between emotional coping and the attitudes variables, smart device preference and scope of academic use. Meaning, the more emotional the way of coping of the respondents the more positive the attitudes, a preference to a smart device is greater and the scope of use is greater.

In order to examine the relationship between research variables: negative and positive attitudes, smart device preference and scope of academic use of smart device Pearson correlations were conducted and are presented in table 2.

* p<.05  ** p<.01  *** p<.001

<table>
<thead>
<tr>
<th>Negative attitudes</th>
<th>Positive attitudes</th>
<th>Negative attitudes</th>
<th>Smart device preference</th>
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<tbody>
<tr>
<td>Negative attitudes</td>
<td>.20*</td>
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<tr>
<td>Smart device preference</td>
<td>.24**</td>
<td>.18*</td>
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<tr>
<td>Scope of academic use</td>
<td>.27***</td>
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Positive correlations were found between positive attitudes and preferences and scope of academic use. Meaning, respondents with more positive attitudes prefer smart devices for academic use and the scope of the academic use is greater. Furthermore, a significant positive correlation was found between smart device preference and the scope of academic use, meaning respondents who prefer smart devices make more use out of it for academic purposes.
VIII. Discussion

The present research explored whether the scope of the academic use of smart devices is affected by the way of coping with difficulties and attitudes towards smart device use. The second objective of this research is to identify the relations between the factors that affect the scope of academic use of smart devices.

The first research question relates to the way students cope when they encounter a problem while using a smart device for academic purposes. As the findings indicate, most of the students attempted to problem solve rather than cope emotionally. These findings are similar to other studies. According to Hahn & Morales (2011) most of the students tried to problem solve rather than deal emotionally. However, they did not expect the students to take things personally when an application failed to live up to their expectations. In their opinion, students less experienced with smart devices react more emotionally when something does not work and they take this failure personally, thus becoming more frustrated. In their opinion, emotional responses and personal characteristics affect use or lack of use of smart devices. The findings also concur with Hong, Hawng, Tai & Chen's study (2014) according to whom, the students who succeeded implementing application activities on smartphones, such as downloading and assimilation software, and overcame the technical limitations of the application expressed less fear of learning the English language via an application.

The findings of the study also match Rahmati & Zhong's research (2013) which examined high school students' behavior and smartphone experience for four months. According to them, when frustrating situations arose in the use of an application, the students asked for help. But, although the problems were solved the students did not continue to make much use of the application. The researchers think that users' subjective opinion of the device and the service is affected by initial impressions and preexisting prejudices.

Contrary to our results and the above mentioned studies, Gikas and Grant (2013) found that students more often reacted emotionally when encountering technological limitations of academic applications, rather than attempting to solve the problems. Picek and Grcic (2013) state that the emotional aspect must be considered in order to avoid the frustration that may accompany learning by mobile.

The second research question related to the students' attitudes regarding the use of smart devices for academic purposes. Differences in attitudes relating to gender, age and academic degree were examined, as well. It is evident from the results that the positive and negative attitudes are quite balanced. However, with regard to gender, the male attitudes were somewhat more positive than the women's. These results are consistent with Khaddage & Knezek's findings (2013) – who examined attitudes towards mobile learning - and those of Viberg & Gronlund (2013) – who examined students attitudes with regard to learning a foreign language via a smart device - all of whom found women's attitudes to be more positive than those of men. On the other hand, studies exist which did not find any differences between the attitudes of men and women. Dunder & Akcayir (2014) examined high school students' attitudes regarding the use of tablets in the educational environment. For a period of six months the students studied and prepared homework assignments on tablets. The study showed that the students' attitudes were positive and they enjoyed using the tablet for these purposes. Furthermore, the students wanted greater access to course contents via educational videos, animation and digital books. They also wanted free surfing and more academic sources so as to make more use of the tablet at home. With regard to gender, no significant differences were found between the boys' and the girls' attitudes towards use of the tablets.

One possible explanation for the differences between the above mentioned studies' findings – some finding differences between the genders while others did not – may lay in the fact that the in the previous studies reflected only the positive opinions of the two genders, whereas our this study examined both the positive and the negative opinions, resulting in the differences between the genders.

Another possible explanation may be that men are more critical and allow themselves to criticize more, so they emphasized the negative sides more than the positive. This is hinted in Aharony's findings (2014) which show that men evaluated the expense of learning from a mobile higher than women.

With regard to the differences between the age groups – research literature regards the youth of today as "digital children". Part ofthe youths' uniqueness is their expertise with smart devices and various technologies. Aharony (2014) reports that young students are more open to mobile digital learning than older students. In her opinion the young students with technological experience are more open to the challenge of new technologies, such as mobile learning. However, this study did not find any differences between the age groups regarding attitudes towards using smart devices for educational purposes. We did not find more positive attitudes among the young nor more negative attitudes in the older group. This is consistent with Viberg & Gronlands' study (2013) which found only a weak connection between age and attitudes regarding language study via mobiles. A possible reason may be found in one of the findings of this study relating to user limitations. The younger group rated the 'lack of mobile network' index more severely than the other groups, possibly because of the high cost involved in surfing on a mobile device.

IX. Examination of the Connections between the Research Variables

The second goal of this study relates to the relationships between the researches variables. The target variable of the current study is the scope of the academic use of the smart device. The study examined the variables, the relationships between one another and the relationships between them and the target variable.
The first research hypothesis states that the more the coping is characterized by problem solving, the more positive the attitudes, the higher the preference for a specific smart device and the greater the academic use. This assumption was not supported. The findings show that the connection between coping by problem solving and attitudes is weak. In other words, the more the student is characterized by the problem solving method, the more negative the attitudes. On the other hand, significant correlation can be found between emotional coping and positive/negative attitudes and significant correlation between emotional coping and extent of academic use. Meaning, students who tend to cope emotionally will express more positive opinions and make more use of the device.

The findings do not draw a clear picture, but we see that emotional coping plays an important part in the formalization of an opinion regarding use of the smart devices. One may ask why emotional coping is more common. One reason may be students' lack of patience. Another reason may be related to the independent learning strategy necessary for technology based learning, which may not be suitable for all students. Bouhnik & Carmi (2013) found that students with introverted thinking styles react positively to studying from afar and express satisfaction with the instruction process because they prefer to learn alone, while students of global and extroverted thinking styles do not gain anything by this type of learning. Another possible explanation may be tied to self-abilities. According to Katz (2013) when people doubt their capabilities they extend less effort and give up more easily.

This study and others mentioned here do not provide a clear enough picture regarding what effects students' attitudes. Further, research is necessary.

The second research hypothesis states that a connection will be found between attitudes and smart device preference and academic use extent. This hypothesis was fully verified. Positive correlations were found between attitudes and device preference and extent of use. These findings are supported by Hashim and his colleagues (Hashim, Tam & Rashid, 2014) who did not find any differences between the genders with regard to their positions. According to them gender plays no role in the decision to adopt new technologies and both male and female are motivated equally to adopt new technologies. Chen and his colleagues (Chen, Lee, Crookes & Song, 2012) also claim that the practical benefit which is related to the smart devices greatly affected the students' attitudes towards mobile learning. Furthermore, at the end of the study the students rated their preference to access academic content via mobile device very highly. Heasun and colleagues (Heasun, Hyunjoo & Daejoong, 2012) found that students' attitudes regarding intentions to adopt mobile technologies is highly affected by social pressures and self esteem.

This study and others mentioned here show that those who hold positive opinions regarding smart device use will make more academic use of these.

According the research that presented in this study (Aharony, 2013; Chen, 2013), it may also be assumed that these students have the confidence that their technological capabilities will allow them to utilize the devices in such a way which will contribute to the studies, thus the positive positions regarding the devices.

REFERENCES


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