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## Concept Learning via SMS Delivery at the University Level

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### Abstract

Latest technology based distance learning and mobile learning delivery platforms include cell phone based SMS technologies that provide access to learning materials without being limited by space or time. Sophisticated technological advances in the domain of pedagogical delivery have led to motivated, flexible, user-friendly, controlled and adaptive learning using cell phone delivery platforms.

In the present study three groups of first year university students who studied Jewish concepts in an elective 15 week long (semester) course were exposed to three different modes of concept delivery. The first group of students received weekly lists of Jewish concepts sent via SMS messages to their cell-phones, the second group received weekly lists of Jewish concepts sent via email messages to their email inboxes, and the third group of students received weekly snail mail lists of Jewish concepts.

The definitions of Jewish concepts studied by SMS, email and snail mail delivery platforms were identical and the students received 20 Jewish concept definitions on a weekly basis (except for weekends) for a period of 15 weeks. At the end of this period the students in the three groups were tested on a standardized Jewish concepts achievement test and responded to a questionnaire that examined their levels of learner curiosity, learner self-efficacy and learner technological self-confidence.

Results of the study indicate that there were no significant differences between the achievement scores on the standardized Jewish concepts achievement test attained by students in the SMS to cell-phone delivery group, the email delivery group and the snail mail delivery group. However, there were significant differences between the students in the three different delivery groups regarding their levels of learner curiosity, learner self-efficacy and learner technological self-confidence. The students who received Jewish concepts via SMS messages indicated a significantly higher level of learner curiosity than their counterparts who received lists of concepts via email messages who in turn exhibited a

significantly higher level of learner curiosity than students who received concepts via snail mail.

Students in the SMS group also had a significantly higher level of learner self-efficacy than their counterparts in both the email and snail mail groups. No significant differences were found between students in the email group and those in the snail mail group on the learner self-efficacy factor. Lastly there were no significant differences between the levels of students in the SMS and email groups on the learner technological self-confidence factor. However, students in both SMS and email groups were significantly higher than students in the snail mail group on this factor.

The results of the study indicate the potential evident in SMS based cell-phone technology regarding enhancement of students' attitudes toward learner curiosity, learner self-efficacy and learner technological self-confidence. Thus cell-phone based SMS messaging can become a viable technological mobile delivery system in the university learning process and serve as a routine platform for the delivery of relevant learning materials.

### ***Abstract in French***

Les dernières technologies d'apprentissage à distance et les plateformes mobiles d'enseignement s'appuient sur les technologies de SMS sur téléphone cellulaire qui permettent l'accès à des contenus pédagogiques en s'affranchissant des contraintes de temps et d'espace. Les avancées technologiques dans la mise à disposition de contenus pédagogiques sur plateformes mobiles ont conduit à un apprentissage, plus motivant, plus flexible, plus interactif, mieux contrôlé et adapté.

Dans cette étude, trois groupes d'étudiants de première année universitaire ayant étudié des concepts juifs durant un semestre de 15 semaines ont été soumis à trois différents modes d'enseignement à distance. Chaque semaine, des listes de concepts juifs ont été envoyées aux trois groupes; par SMS sur téléphone cellulaire au premier groupe d'étudiants, par courrier électronique au deuxième groupe d'étudiants et par courrier postal au troisième groupe d'étudiants.

Les définitions des concepts juifs étudiées étaient identiques quel que soit la plateforme mobile d'enseignement utilisée; SMS, courrier électronique ou courrier postal. Pendant 15 semaines, les étudiants des trois groupes ont reçu, chaque semaine (sauf le week-end), 20 définitions de concepts juifs. Au terme de cette période, les trois groupes d'étudiants ont passé un examen visant à tester leurs connaissances sur ces mêmes concepts juifs étudiés et ont répondu à un questionnaire mesurant leurs niveaux de

curiosité, d'efficacité et de confiance en soi liée à l'utilisation des technologies.

Les résultats de l'étude montrent l'absence de différence significative entre les différents groupes d'élèves quant à leurs résultats à l'examen portant sur les concepts juifs, qu'ils appartiennent au groupe ayant reçu les concepts juifs par SMS, par courrier électronique ou encore par courrier postal.

Cependant, les résultats ont indiqué des différences significatives entre les élèves des trois groupes quant à leurs niveaux de curiosité, d'efficacité et de confiance en soi liée à l'utilisation des technologies. Les étudiants ayant reçu les concepts juifs par SMS ont manifesté un niveau de curiosité significativement plus élevé que les étudiants ayant reçu les listes de concepts juifs par courrier électronique. Cependant, ces derniers ont manifesté un niveau de curiosité significativement plus élevé que les étudiants ayant reçu les concepts juifs par courrier postal.

Les élèves appartenant au groupe utilisant le SMS avaient également un niveau d'efficacité significativement plus élevé que les étudiants du groupe utilisant le courrier électronique ou encore que les étudiants sollicités par courrier postal. Aucune différence significative n'a été trouvée entre les étudiants du groupe sollicité par courrier électronique et ceux du groupe sollicité par courrier postal sur le facteur d'efficacité. Enfin, aucune différence significative n'a été relevée entre les niveaux des élèves du groupe utilisant le SMS et les élèves du groupe utilisant le courrier électronique sur leur confiance en soi liée à l'utilisation des technologies. Toutefois, les élèves appartenant au groupe utilisant le SMS ainsi que les élèves ayant utilisé le courrier électronique ont manifesté des niveaux de confiance en soi liée à l'utilisation des technologies plus élevés que les étudiants appartenant au groupe sollicité par courrier postal.

Les résultats de l'étude montrent un potentiel évident dans l'utilisation du SMS par téléphone cellulaire dans l'amélioration des comportements des élèves à l'égard de leur curiosité d'apprentissage, de leur efficacité ou encore par rapport à leur confiance en soi liée à l'utilisation des technologies. Ainsi, dans le processus d'apprentissage universitaire, la messagerie SMS sur téléphone cellulaire peut devenir un système viable de transmission par technologie mobile et servir de plateforme courante pour l'enseignement de contenus pédagogiques.

**Keywords:** SMS; Email; Snail Mail; Learner Curiosity; Learner Self-Efficacy; Learner Technological Self-Confidence

## **Introduction**

Many universities increasingly implement a variety of technology based distance learning methodologies as viable alternatives to traditional classroom instruction. Distance learning platforms via internet, email and cell-phones are increasingly penetrating the domain of academic learning and provide students with dramatically increased access to sources and subject matter relevant to their studies. Current technology based distance learning is, inter alia, based on materials provided through methodologies such as internet, email and cell-phones and an ever increasing number of research studies are being conducted in order to verify the educational value of such technology based distance learning methodologies at the university level (Harris, 2012).

## **Technology based distance learning**

Distance learning has developed over the years to overcome the limitations of traditional face-to-face learning which necessitates the presence of the student in a formal classroom setting. From its inception when distance learning was confined to the delivery of learning material via snail mail, landline telephone and radio broadcasts, it has progressed through delivery systems such as television broadcasts and videoconferencing and at present focuses on digital delivery systems such as internet, email and mobile learning platforms (Katz & Yablon, 2003).

Recent studies have indicated that distance learning systems are perceived by students as being convenient, flexible, time saving and cost saving (Valenta et al., 2001). Interactive internet, email and mobile learning offer tuition that is especially characterized by flexibility offered to the learner. In addition the above methodologies are designed to provide platforms that enhance modification, reinforcement and even modelling of learning processes, thereby fulfilling the cognitive as well as affective needs and requirements of students (Richardson & Swan, 2003).

Ismail et al. (2010) confronted the implications of university learning and instruction using technology based distance learning courses. They contended that technology based distance learning has moved formal instruction in these courses from the on-site setting of the university campus to the home of the student. Learning has become significantly more flexible and content sources more accessible. Creating, sharing and knowledge capitalization are all facilitated by distance learning. Wider sources of learning are provided in technology based distance learning courses and worldwide expertise can systematically be brought to the student's desktop.

With the rapid development of distance learning courses for use in university level education, increasingly more research studies have been conducted in an attempt to evaluate different issues related to technology based distance learning. For example Chandra & Watters (2012) indicated that learning physics through the medium of technology based distance learning not only enhanced students' learning outcomes, but also had a positive impact on their attitudes toward the study of physics. Ituma (2011) confirmed that a large percentage of university students who were enrolled in distance learning university courses had positive perceptions of the technology based learning methodology and were in favour of joining additional distance learning courses that supplemented traditional face-to-face classroom instruction.

Valaitis et al. (2005) found that students who participated in technology based distance learning courses perceived that the methodology increased their learning flexibility and enhanced their ability to process content, and provided access to valuable learning resources. Abdallah (2009) found that technology based distance learning courses contributed to improved quality of students' learning experiences. Students reported positive attitudes toward their technology based learning and felt that such learning should be part and parcel of standard learning practice. Delfino et al. (2010) confirmed that student teachers who participated in technology based distance learning teacher training courses developed self-regulation of learning which provided them with the opportunity to flexibly cope with their academic assignments.

### **Cell-phone learning**

One of the emerging learning strategies that has developed in technology based distance learning in recent years and is receiving growing attention from both students and teachers is in the domain of mobile learning, and more specifically, focuses on cell-phone learning technology (Prensky, 2005). It should be noted that the use of cell-phones is multi-dimensional and cell-phone technology now provides technological possibilities including voice, text, still-camera, video, paging and geo-positioning capabilities. These tools provide a rich variety of platforms that enhance the learning process. Moreover, learning is not bound by space or time and students can choose to engage in learning without almost any limitations (Dieterle & Dede, 2006).

In Europe, China, Japan, and the Philippines, students already use cell-phones as learning tools. Thornton and Houser (2002, 2003) described several innovative projects using cell-phones to teach English at a Japanese university and the BBC World Service's Learning English section offers English lessons via SMS in Francophone West Africa and China (Godwin-Jones, 2005). Cell-phone based

learning projects managed by several universities worldwide have indicated the positive outcomes of such learning methods (Divitini et al., 2002; Garner et al., 2002; Seppala, 2002; Stone & Briggs, 2002). Additional studies have described language learning based on cell-phone technology (Kiernan & Aizawa, 2004; Katz & Yablon, 2009; 2011; 2012). These studies describe how vocabulary transmitted by SMS in a spaced and scheduled pattern of delivery contributed to student proficiency in English or other languages.

Research studies have been conducted in order to investigate the relationship between students' attitudes toward the cell-phone based learning process. Learner motivation, learner autonomy, learner control of the learning process, learning flexibility, learner curiosity, learner self-efficacy, learner technological self-confidence, and user friendliness of the technology strategy are some of the major factors that have been found to contribute to the enhancement of technology based distance learning. Mainemelis et al. (2002), Zurita and Bruce (2005), Cavus and Ibrahim (2009) as well as Katz and Yablon (2009, 2011, 2012) confirmed the association of some of the above factors with effective cell-phone based learning.

As Katz and Yablon (2009, 2011, 2012) have studied the centrality of students' attitudes including learner motivation, learner autonomy, learning flexibility and user friendliness of the technology strategy toward cell-phone learning at the university level in Israel, the current study, pays particular attention to students' attitudes toward three additional factors thought to enhance effective learning by cell-phone based SMS messaging, namely learner curiosity, learner self-efficacy and learner technological self-confidence, In addition the study examines the issue of academic achievement attained when using SMS delivery for the learning of concepts.

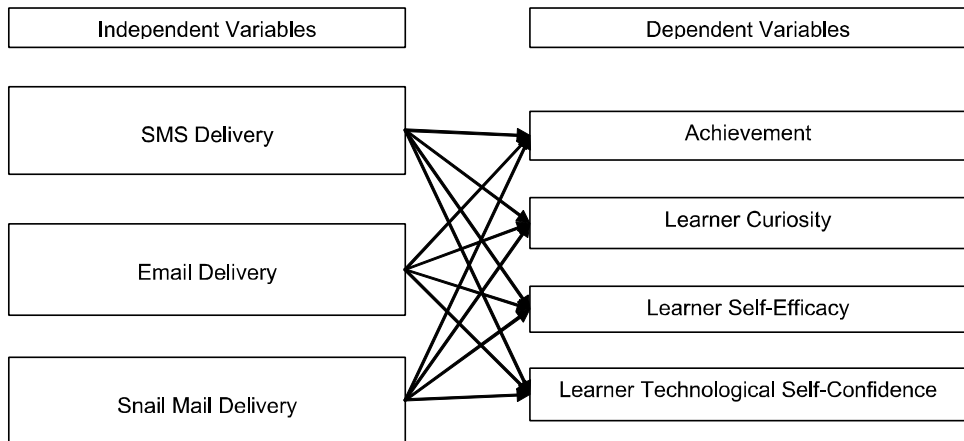


Figure 1. Graphic Illustration of the Research Model

## Method

### Sample

The research sample consisted of 79 first year students enrolled in a 15 week semester-long elective Jewish concepts foundation course offered at one of the seven chartered universities in Israel. The students were randomly assigned to the three different research groups in which students were provided with lists of definitions of Jewish concepts as follows:

1. 28 students received their Jewish concepts lists via cell-phone based SMS messages.
2. 26 were sent their Jewish concepts lists via email messages to their email inboxes.
3. 25 students were sent their Jewish concepts lists by snail mail delivery.

### Instruments

Two research instruments were administered to the students in this research study. A standardized Jewish concepts test was administered to the participants in order to assess students' mastery of definitions of basic Jewish concepts. The test scale ranged from 0-100, the higher grades indicating higher levels of achievement on the Jewish concepts test. The second instrument administered was a 21 item Likert scale type response questionnaire (students responded to a five point scale with 1 = totally disagree and 5 = totally agree) designed to examine the students' perceptions of the

attitudinal research factors as follows: The first factor, learner curiosity, contained seven items (Cronbach  $\alpha = 0.82$ ), the second factor, learner self-efficacy, consisted of eight items (Cronbach  $\alpha = 0.86$ ) and the third factor, learner technological self-confidence, was made up of six items (Cronbach  $\alpha = 0.88$ ).

### ***Procedure***

Students who were graduates of the Israeli state secular school system and who were enrolled in the elective Jewish concepts foundations course and possessed personal cell-phones with texting capacity were eligible for participation in this study. Following the selection of the students who met the above criteria, they were randomly assigned to the three delivery platform groups. Students in the first group received Jewish concepts via cell-phone based SMS messages; those in the second group received Jewish concepts via email messages; and those placed in the third group received Jewish concepts via snail mail.

The students in the three groups were sent weekly lists that contained concise definitions of the Jewish concepts studied in the course, each list containing definitions of 20 new Jewish concepts delivered via the respective learning strategies. Thus each of the students received definitions of 300 Jewish concepts during the 15 week long course. On completion of the course the students in the three groups were administered a standardized Jewish concepts achievement test in order to assess their level of knowledge of the 300 Jewish concepts taught in the course. In addition they were administered the attitudinal questionnaire which examined their scores on the three attitudinal research factors, namely learner curiosity, learner self-efficacy and learner technological self-confidence.

### **Results**

The main aim of this study was to examine the efficiency and effectiveness of three different learning delivery platforms of which two were digital. Two research questions were posed: the first examined the acquisition by students of knowledge concerning Jewish concepts and the second investigated students' attitudes connected to the three learning strategies. The mean scores of each of the attitudinal factors were standardized in order to allow for a comparison between the factor scores. Standardized means and standard deviations of students' scores on the achievement test and on the attitudinal factors are presented in Table 1.



Table 1: Standardized Mean Scores and Standard Deviations of SMS, Email and Snail Mail Groups for Achievement, Learner Curiosity, Learner Self-Efficacy and Learner Technological Self-Confidence

Group	Learner Curiosity Factor		Learner Self-Efficacy Factor		Learner Technological Self-Confidence Factor		Achievement	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
SMS Delivery N=28	3.55	0.24	2.85	0.42	3.84	0.46	82.62	10.71
Email Delivery N=26	3.13	0.52	2.55	0.43	3.79	0.49	82.53	11.39
Snail Mail Delivery N=25	2.93	0.51	2.50	0.41	3.48	0.41	81.97	10.32

Four one-way ANOVA procedures were used in order to compare students' achievement and attitudes as related to the three learning delivery platforms. Results of the statistical analyses indicated that while there were no significant differences between students in the three groups regarding achievement, with students from the three groups achieving similar grades on knowledge of Jewish concepts, significant differences were found for learner curiosity [ $F(2,76) = 14.30, p < 0.001, \eta^2 = 0.27$ ], for learner self-efficacy [ $F(2,76) = 5.18, p < 0.01, \eta^2 = 0.12$ ] and for learner technological self-confidence [ $F(2,76) = 4.93, p < 0.001, \eta^2 = 0.16$ ]. Post-hoc Scheffe tests were then computed to establish the level of intra-group differences. The first Scheffe test revealed that students who received Jewish concepts via SMS messages attained significantly higher scores on the learner curiosity factor than students who received concepts via email messages who in turn achieved significantly higher scores than students who received their list of concepts by snail mail. The second Scheffe test indicated that students who received concepts through the medium of SMS messages attained significantly higher scores on the learner self-efficacy factor than either students who received concepts via email messages or those who received their concepts by snail mail. There was no significant difference between the scores attained on this factor by students in the email and snail mail groups. The third Scheffe test confirmed that while students in the SMS and email groups achieved significantly higher scores on the learner technological self-confidence factor than students in the snail mail group, there was no significant difference between the scores of students in the SMS and email groups on this factor.

## Discussion

Results of the statistical analyses of the data collected in this study indicate that none of the three delivery platforms, namely delivery of the lists of Jewish concepts throughout the semester long course via SMS messages to students' cell-phones, delivery to students' email inboxes and delivery to students via snail mail, had any

significant advantage regarding academic achievement of students on the standardized Jewish concepts achievement test. Students who studied via all three delivery strategies attained similar grades on the test. Thus it appears that achievement is a factor that does not distinguish between delivery strategies with measured achievement outcomes. This result confirms those indicated in a number of research studies that, on the whole, different delivery platforms do not significantly contribute to differential academic achievement (Katz & Yablon, 2009, 2011, 2012).

However, the findings of the study indicate that the different delivery strategies employed in the present study to provide weekly lists of Jewish concepts to the students are associated with significantly differential levels of learner curiosity, learner self-efficacy and learner technological self-confidence. Scores attained by students on the attitudinal research factors, after receiving lists of Jewish concepts delivered via the three delivery strategies, confirm that SMS messaging to cell-phones is associated more significantly to students' learner curiosity and learner self-efficacy (as found by Kenny et al., 2012) than either email messages or snail mail delivery. The contribution of email messages, although less significant than that of the SMS delivery strategy, also contributed more significantly to students' learner curiosity and learner self-efficacy than lists received by snail mail. In addition, the SMS messages of lists of Jewish concepts sent to students' cell-phones as well as lists sent to students' email inboxes made a significantly higher impact on students' learner technological self-confidence than lists of concepts sent to students via snail mail. Although there is no statistically significant difference between students' levels of learner technological self-confidence after receiving lists of Jewish concepts via SMS or email delivery systems, the mean level of learner technological self-confidence of students' who received concepts via SMS delivery is higher than the mean level of their counterparts who received concepts through the medium of email delivery. It appears that as both SMS messages to students' cell-phones as well as lists sent to students' email inboxes may be identified as technologically oriented delivery strategies, they have a more significant impact on learner technological self-confidence than lists of concepts sent to students via snail mail.

It appears that learner curiosity is the most potent of the research factors and most significantly distinguishes between students who studied by way of the three learning strategies. Cell-phone based SMS strategy appears to be most significantly related to the learner curiosity of students towards the learning process, followed by a more moderate level of learner curiosity of those who experienced the email learning

delivery, who in turn have a comparatively higher level of learner curiosity than students who received learning material via the snail mail learning strategy.

The results of the present study indicate the potential of SMS messaging of relevant subject matter as a positive delivery platform that enhances affective variables such as learner curiosity, learner self-efficacy and learner technological self-confidence. It should be noted that the significant attitudinal findings do not correlate with higher academic achievement when the three delivery platforms are compared. Further studies need to be conducted so as to further explore the possible relationship between academic achievement and students' attitudes toward learner curiosity, learner self-efficacy and learner technological self-confidence. From a pedagogical point of view it appears that, In general terms, cell-phone-based SMS messaging leads to more significantly positive attitudes of students (as indicated by Song, 2008) than email or snail mail messaging with learner curiosity perceived as the central factor that best distinguishes between the three delivery strategies studied in the present research.

## **Conclusion**

In conclusion it may be stated that the results of the present study indicate that, while the three delivery platforms used in the study to provide students with weekly lists of Jewish concepts were no different from each other in promoting students' academic achievement, the relative advantages of cell-phone based SMS messages most positively enhanced learner curiosity, learner self-efficacy and learner technological self-confidence of students. The results of the present study regarding the relationship between the delivery of subject matter at the university level via SMS messages sent to students' cell-phones and students' levels of learner curiosity, learner self-efficacy' learner technological self-confidence add to the findings of other research studies that indicated the significance of the SMS to cell-phone delivery platform for students' levels of learner motivation, learner autonomy, learner control of the learning process, learning flexibility and user friendliness of the technology strategy (following Divitini et al., 2002; Garner et al., 2002; Seppala, 2002; Stone & Briggs, 2002; Thornton & Houser, 2002, 2003; Katz & Yablon, 2009, 2011, 2012) These studies indicated that cell-phone based SMS delivery systems can be offered as a positive alternate technology based delivery system of relevant subject matter when compared to other technology based learning strategies that utilize expensive and sophisticated infrastructures. University educational systems in all societies, whatever their technological infrastructure, can profit immeasurably from the use of SMS to cell-phone learning content delivery in relevant university subjects and courses. More

accessible technology and improved pedagogy need to be developed in order to enhance the use of cell-phone based SMS delivery in routine learning at the university level but it seems clear that the mass incorporation of cell-phones in institutions of higher education is a distinct possibility in the foreseeable future.

## References

1. Abdallah, S. (2009). Learning with online activities: What do students think about their experience? *International Journal of Web-Based Learning and Teaching Technologies*, 4(2), 1-25.
2. Cavus, N., & Ibrahim, D. (2009). M-Learning: an experiment in using SMS to support learning new English language words. *British Journal of Educational Technology*, 40(1), 78-91.
3. Chandra, V., & Watters, J. J. (2012). Re-thinking physics teaching with web-based learning. *Computers & Education*, 58(1), 631-640.
4. Delfino, M., Dettori, G., & Persico, D. (2010). An online course fostering self-regulation of trainee teachers. *Psicothema*, 22(2), 299-305.
5. Dieterle, E., & Dede, C. (2006). Building university faculty and student capacity to use wireless handheld devices for learning. In M. van't Hooft & K. Swan (Eds.), *Ubiquitous computing in education: Invisible technology, visible impact* (pp. 303–328). Mahwah, NJ: Lawrence Erlbaum Associates. Available online at <http://gseacademic.harvard.edu/~hdul/ubicomp-in-ed-dieterle-dede-final.pdf>
6. Divitini, M., Haugalokken, O. K., & Norevik, P. (2002). Improving communication through mobile technologies: which possibilities? *Proceedings of the International Workshop on Wireless and Mobile Technologies in Education, Växjö, Sweden*, 86-90.
7. Garner, I., Francis, J., & Wales, K. (2002). An evaluation of the implementation of a short messaging system (SMS) to support undergraduate students. *Proceedings of the European Workshop on Mobile and Contextual Learning, Birmingham, UK*, 15-18.
8. Godwin-Jones, R. (2005). Messaging, gaming, peer-to-peer sharing: language learning strategies and tools for the millennial generation. *Language Learning & Technology*, 9(1), 17-22.
9. Harris, D. (2012). Digital natives revisited: Developing digital wisdom in the modern university. *E-Learning and Digital Media*, 9(2), 173-182.

10. Ismail, I., Idrus, R. M., & Johari, S. S. M. (2010). Acceptance on mobile learning via SMS: a Rasch model analysis. *International Journal of Interactive Mobile Technologies*, 4(2), 10-16.
11. Ituma, A. (2011). An evaluation of students' perceptions and engagement with e-learning components in a campus based university. *Active Learning in Higher Education*, 12(1), 57-68.
12. Katz, Y. J., & Yablon, Y. B. (2003). Online university learning: cognitive and affective perspectives. *Campus Wide Information Systems*, 20(2), 48-54.
13. Katz, Y. J., & Yablon, Y. B. (2009). Mobile learning: a major e-learning platform. In A. Szucs, (Ed.), *New technology platforms for learning revisited* (pp. 121-126). Budapest: European Distance Education Network.
14. Katz, Y. J., & Yablon, Y. B. (2011). Affect and digital learning at the university level. *Campus Wide Information Systems*, 28(2), 114-123.
15. Katz, Y. J., & Yablon, Y. B. (2012). Acquiring vocabulary at the university level: a comparison of three learning strategies. In F. Doyran (Ed.), *Research on teacher education and training* (pp. 267-276). Athens: Athens Institute for Education and Research.
16. Kenny, R. F., van Neste-Kenny, J. M. C., Burton, P. A., Park, C. L., & Qayyum, A. (2012). Using self-efficacy to assess the readiness of nursing educators and students for mobile learning. *International Review of Research in Open and Distance Learning*, 13(3), 277-296.
17. Kiernan, P. J., & Aizawa, K. (2004). Cell phones in task based learning: Are cell phones useful language learning tools? *ReCALL*, 16(1), 71-84.
18. Mainemelis, C., Boyatzis, R. E., & Kolb, D. A. (2002). Learning styles and adaptive flexibility: testing experiential learning theory. *Management Learning*, 33(1), 5-33.
19. Prensky, M. (2005). Listen to the natives. *Educational Leadership*, 63(4), 8-13.
20. Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68-88.
21. Seppala, P. (2002). Mobile learning and mobility in teacher training. *Proceedings of the IEEE International Workshop on Wireless and Mobile Technologies in Education*, Växjö, Sweden, 130-135.

22. Song, Y. (2008). SMS enhanced vocabulary learning for mobile audiences. *International Journal of Mobile Learning and Organisation*, 2(1), 81-98. Available online at <http://www.inderscience.com/info/inarticletoc.php?jcode=ijmlo&year=2008&vol=2&issue=1>
23. Stone, A., & Briggs, J. (2002). ITZ GD 2 TXT – how to use SMS effectively in m-learning. *Proceedings of the European Workshop on Mobile and Contextual Learning, Birmingham, UK*, 11-14.
24. Thornton, P., & Houser, C. (2002). M-learning in transit. In P. Lewis (Ed.), *The changing face of CALL* (pp. 229-243). Lisse, Netherlands: Swets and Zeitlinger.
25. Thornton, P., & Houser, C. (2003). Using mobile web and video phones in English language teaching: Projects with Japanese college students. In B. Morrison, C. Green & G. Motteram (Eds.), *Directions in CALL: Experience, experiments & evaluation* (pp. 207-224). Hong Kong: English Language Centre, Hong Kong Polytechnic University.
26. Valaitis, R. K., Sword, W. A., Jones, B., & Hodges, A. (2005). Problem-based learning online: perceptions of health science students. *Advances in Health Sciences Education*, 10(3), 231-252.
27. Valenta, A., Therriault, D., Dieter, M., & Mrtek, R. (2001). Identifying student attitudes and learning styles in distance education. *Journal of Asynchronous Learning Networks*, 5(2), 111-27.
28. Zurita, L., & Bruce, B. C. (2005). *Designing from the users side: reaching over the divide*. Paper presented at Computer Supported Collaborative Learning (CSCL) Conference, Taipei, Taiwan.