

'SMART' Pedagogy to manage invasion of Smartphones in m-campus

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Abstract

BYOD (bring your own device) concept has been adopted by many universities (Cisco, 2012). The popularity of Smartphones is very high amongst Emirati students (Santos, 2010). While it is evident that the smartphones cannot be separated from this millennial generation, the researchers thought of probing into tapping the usage of smartphones for designing a SMART pedagogy. Five significant elements have been covered to effectively use Smartphones as an educational tool – Sharing Content; Messaging; Assignments; Revisions; and Tests. Based on this, authors have designed SMART pedagogy. Although the word SMART is based on initials of the essentials but the paper concludes that it is really a smart and practical pedagogy indeed.

This paper is intended to assist teachers in creating SMART pedagogy to facilitate learning via smartphones. Authors have analyzed the various factors attributing to the application of Smartphones as a learning device. This research paper intends to explain the ratio of importance of these five components in view of students which in turn supports instructors to select the right mix and include that in their pedagogy. One of the assumptions made in this paper is that the instructors and students are well versed in the usage and application of Smartphones.

Keywords: : Smartphone, m-learning, m-campus, SMART pedagogy

Introduction

Nearly 90% of Emirati university students would go back to their homes to collect their forgotten cell phones; about 80% would answer their phones in middle of the shower; and around 70% acknowledged that their parents give them missed calls to grab their attention. This was revealed in the study conducted by Mahboub Hashem and Susan Smith on the level of cell phone addiction amongst Emirati youth (Hashem & Smith, 2011). Observably, the same phenomena exists in most of the colleges in UAE. In our college, we have observed that nearly all students have smartphones and some female Emirati students even carry more than one phone. The popularity of Smartphones is very high amongst Emirati students (Santos, 2010). While it is evident that the smartphones cannot be separated from this millennial generation, the researchers thought of probing into tapping the usage of smartphones for designing a SMART pedagogy.

In a research study conducted by ECAR, it was suggested that Smartphones are brought in colleges by many undergraduate students (Dahlstorm, 2012). BYOD (bring your own device) concept has been adopted by many universities (Cisco, 2012). Students find Smartphones as a very useful device as it enhances subject knowledge and fosters collaborative work (Vazquez-Cano, 2014). Developed and developing countries are trying to use smartphones in delivering education to middle and higher levels (United Nations Educational, 2013). Considering popularity and high usage of mobile phones among teenagers and students, IT industry had to reform their technology to design mobile friendly educational applications. And since 2001 in alliance with education industry many educational apps had been introduced to facilitate the learning process.

In this nifty era, academicians are facing the challenges of making more concise, functional, user-friendly and expedient lesson plan suitable for smartphones.

This paper is intended to assist teachers in creating SMART pedagogy to facilitate learning via smartphones. This paper suggests important features for the effective SMART pedagogy which can make learning effective and successful with the help of different learning applications available for smartphones. Smartphones have a plethora of apps and features that makes learning a wonderful experience but every coin has two sides. This paper also highlights the silent and evil features of smartphone learning that also can disrupt the learning effectiveness. The focus of this study is to know and understand the best practices that we should apply in our pedagogy using Smartphones in addition to the conventional teaching methods. The intention of this research is not to analyze, evaluate and compare different applications available for learning but to provide the guidance to optimize the available features and applications required for SMART pedagogy.

Authors have analyzed the various factors attributing to the application of Smartphones as a learning device. Efforts have been made to identify the reasons for the popularity of Smartphones for learning. An intensive literature review was conducted to understand the prerequisites for effective use of smartphones for teaching and learning and how this device has been used in past for education purpose. Based on this, authors have designed SMART pedagogy. Although the word SMART is based on initials of the essentials but the paper concludes that it is really a smart and practical pedagogy indeed. Authors have named these essentials as SMART pedagogy which highlights five significant components for effective implementation of Smartphones as the learning device. The first component 'S' depicts the Sharing of content. This includes designing, delivery, and

reception of course material, i.e. course content. The second initial 'M' represent Messaging to and fro between the teacher and student. This messaging could be via email, sms, whatsapp, and similar modes. The third component of SMART pedagogy is 'A', representing Assignments. It is very vital that Smartphone technology should support designing, submission, and grading assignments using Smartphones. The second last component is 'R' for Revision. The flashcards, quizzes, bite-size content are some examples of the features available n Smartphones for quick revision of the content. And the last component identified by authors in SMART pedagogy is 'T', representing testing. Testing signifies the completion of the pedagogy. Teachers should be able to design tests using smartphones and students should be able to attend these exams using their phones. This should be done without violating the credibility of the exam.

This research paper intends to explain the ratio of importance of these five components in view of students which in turn supports instructors to select the right mix and include that in their pedagogy. One of the assumptions made in this paper is that the instructors and students are well versed in the usage and application of Smartphones.

Literature Review

The factors that instigate usage of Smartphones by students are interactivity, flexibility, engagement, and most importantly, convenience (Seilhamer, Chen, & Sugar, 2013). The content can be accessed and communicated at any time and from anywhere (Looi, Seow, Zhang, & Chen, 2010). High levels of collaborative learning can be attained as a result of high rate of communication through Smartphones. 100% Smartphone users use their devices to communicate as oppose to 80% of PDA users. This fact has replaced the ipads from smartphones and hence the focus is on smartphones as a learning device. As Smartphones has instant connection facility, it allows instructors and learners to produce, discover, and consume the content instantly (Dahlstorm, 2012). It facilitates sharing of content; workings and submissions of assignments; and quick revisions.

Patten et al., 2006 proposed a functional framework for formal mobile learning. Three categories were suggested for suitability of learning with Smartphones, viz., data collection, location aware and collaborative (Patten, Sanchez, & Tangney, 2006). Cheung & Hew, 2009, has proposed seven categories of uses of mobile devices for learning. These seven tools are communication, multimedia access, capture, representational, analytical, assessment and task management (Cheung, & Hew, 2009). However, these researches focused on the general usage of Smartphones in

education but did not emphasize on the pedagogical strategies. Further review was done for each element of the SMART pedagogy, which is highlighted in the following section.

Sharing Content:

Studies have suggested that there is an increase in demand for smartphones-friendly content and resources by students (Dahlstorm & Warraich, 2013). Mobile learning has opportune the distribution of the subject content to learners (Muyinda, Lubega, & Lynch, 2010). Content can be quickly delivered to learners via Smartphones (Clough, Jones, McAndrew, & Scanlon, 2007)

One of the problems associated with Sharing content for Smartphones usage is the small size of the screen (Vazquez-Cano, 2014). But Smartphones have overcome most of the technological limitations like processing speed, screen resolution and weight (Keegan, 2005). Due to the facility of supporting a plethora of applications on Smartphones, creation of content and storing the content has become very powerful ((Kennedy, 2014). Students can use tools like Plucker, Newsfeeds and Avantgo, as these tools make the downloaded information in a format easily displayable on the Smartphones (Clough et al., 2007).

Learning through Smartphones is supported by contents in different formats including text, audio, videos of small size, and microblogging apps. There is a high level of satisfaction amongst students with regards to availability of course content on their smartphones (Vazquez-Cano, 2014).

2.2 Assignments

Designing teaching content and performing assessments on the Smartphones is often repressed by the difficulty of entering data into the device. (Smørdal & Gregory, 2003) A study suggested that Smartphones will be widely accepted in an Educational organization, if there is an allowance of assignment submission via smartphone to students (Vazquez-Cano, 2014). With the facility of a camera, voice recording, text messaging and phone calls, students prefer to use Smartphones for project works (Cook , Pachler , & Bradley, 2008).

Digital policies have been revised by Universities to leverage the application of mobile devices for project works and assessments (Johnson, Becker , & Estrada, 2014).

Messaging

Besides access to the tremendous amount of information, synchronous and asynchronous communication using Smartphones is made possible due to strong connectivity.

Synchronous communication involves conversation over the telephone, VOIP, face-to-face chats, messaging; and Asynchronous communication incorporates wiki, blogging, emailing, web forums, virtual learning environments and text messaging. (Clough et al., 2007)

Revision

Talk notes and built in Audio recorder are some application that can be used by students for taking notes, revision and individual reflective activities.(Clough et al., 2007)

Testing

Application of Smartphones in an education setting will be more successful if professors can grade and comment on the students' assessments using smartphones (Vazquez-Cano, 2014).

Research on using Smartphones and other mobile devices is evolving in educational field (Johnson , Means, & Khey, 2013). However, very limited research has been conducted on strategies of using Smartphones for learning. After reviewing the literature done in the field of using Smartphones as a learning device, it is found that many researches have been conducted on usefulness and efficiency of using Smartphones for learning but very limited research has been conducted on the Pedagogies using Smartphones as a learning device. More research is required to identify the strategies in order for increase the level of students' engagement in learning (Chen & DeNoyelles, 2013). Therefore this paper has put forth the preliminary steps in this area of research.

Research Methodology

Appropriate arguments have been identified with the application of qualitative research. The observation was the basis to collect data and this observation was based on the guidelines prepared in consultation with a panel of 10 educators with overall experience in the total of 102 years. These educators have been delivering education using smartphones in addition to conventional delivery mode. The sample size of 100 comprised of business students who have experienced learning using smartphones throughout one semester. Researchers have experimented the narrative part in eight classes of business management courses in the Spring semester of 2015. The narrative parts of the observations are well suited and linked to the literature review.

Observations were documented on paper in the text format, then transcribed and structured via argumentation tables. Content analysis was used to analyze and categorize the

data. In order to assure trustworthiness the observations were done on only the full-time students and data was then analyzed by the researchers. In the field, two researchers worked together to create credibility, validity, and the securing of the identity of the participant. Concerning validity, it can be stated that all categories that emerged from the data are consistent with the understandings of the participants.

Researchers designed the framework depicted in Figure 1 to measure different attributes for each element of SMART pedagogy. This framework was used to measure the ratio of different elements and the findings focus on these attributes.

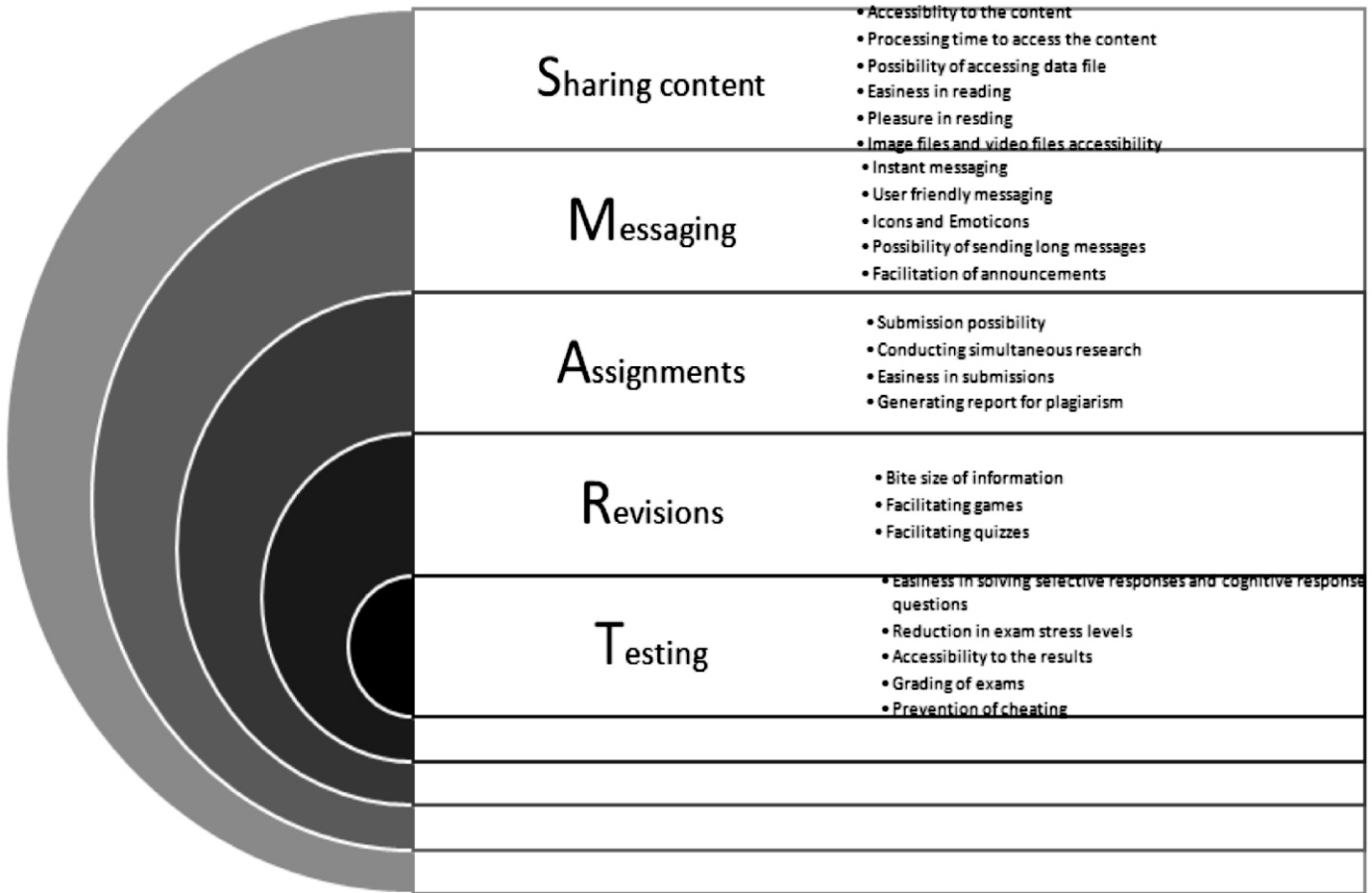


Fig. 1 – SMART pedagogy framework with attributes for learning via Smartphones

Findings

Based on the data collected through observation, the researchers found that Smartphones cannot be the sole medium for learning. While Smartphones are effective for the elements SMART but T, testing, is not well supported for these devices. Nonetheless, Smartphones can be used as a supplementary tool for effective learning. None of the essentials of SMART pedagogies secured a 100% favorable response from students. Simultaneously an average

favorable response in each element except Testing is more than 40% which indicates a positive acceptance of Smartphones in the education sector. It also subscribes to the advantages of smartphones at the m-campuses. Table 1 and 2 clearly depicts that the favorable responses for different attributes of SMART elements have surpassed the unfavorable responses. Therefore it is found that Smartphones have been proved to be a significant medium in the blended learning.

Table 1. Favorable responses for different attributes of 'SMART' elements

Element	Attributes	Favorable response(%)	Element	Attributes	Favorable response (%)
Sharing Content	Pleasure in reading short text files	96	Messaging	User friendly messaging service	96
	Easiness in reading content of low volume	92		Instant messaging	96
	Possibility of assessing small data files	90		Applicability of Icons and emoticons	90
	Processing time to access the content	90		Facilitation for group messaging	88
	Pleasure in learning through watching videos	88		Facilitation for announcements	86
	Accessibility to image files	84			
Element	Attributes	Favorable response (%)	Element	Attributes	Favorable response (%)
Assignments	Easiness in assignment submissions	70	Revision	Facilitating games	66
	Possibility of text submission	68		Facilitating quizzes	62
	Possibility to submit image files	62	Testing	Easiness in solving selective responses questions	62

Many attributes were probed into for each essential of the SMART pedagogy. For 'S', i.e. Sharing Content attributes like accessibility to the content, processing time to access the content, possibility of accessing large and small data files, easiness in reading the content, pleasure in reading the content, accessibility to image files and pleasure of watching the videos were covered in the research. The most favorable response of 96% reflects students' appreciation for reading the short text files followed by the favorable response of 90% towards processing time to access the content as well as for the possibility of accessing small data files. However, not all attributes for sharing the content received the remarkable favoritism as mentioned above. Non-favorable response of reading the content of high volume (12%) and pleasure of reading long text file (6%) was found for the content sharing. Critically examined, the possibility of accessing large data file (10%) is deemed to have low appreciation by students probably because it depends on individuals internet speed. Accessibility to image files (84%) and pleasure in learning through watching the video (88%) has shown remarkably favorable response it is the indication of using mobile as an asset for visual learning. Accessibility to the content is showing an average favorable response of 60%, this attribute depends on the habit of individuals that how often they prefer to use mobile,

how comfortable they are in reading on mobile, internet speed and time convenience.

Digging into the important element of SMART, it has been found that Messaging has received the highest favorable response (78%) from the students. The attributes covered for messaging were user-friendly messaging service, instant messaging, applicability of Icons and emoticons, facilitation for group messaging, possibility of sending long messages, and facilitating announcements. Except possibility of sending long messages (12%), all other attributes had distinction result for the favorable response. There are feeble chances of doubting on the efficiency of messaging attributes. Infact, it empowers instructors and students with the powerful communication tool. This facilitates functions such as announcements, instant messages, reminders, and message boards. Icons and emoticons have dashed the spices to the learning food which opens the communication link and creates a sense of closeness between and instructors which in turns boost up the confidence and motivates students to learn more. The downside of this messaging facility is the informal setting of classroom and privacy preferred by instructors which can influence the quality and sincerity towards learning.

Table 2. Unfavorable responses for different attributes of 'SMART' elements

Element	Attributes	unfavorable response (%)	Element	Attributes	Unfavorable response (%)
Sharing	Pleasure in reading long text files	74	Messaging	Possibility to send long messages	78
	Possibility of assessing large data files	68		Testing	Prevention of cheating
Content	Easiness in reading content of high volume	82			Accessibility to instant results
	Assignments	Simultaneous research possibility	84	Revision	Understanding content

The third element of SMART pedagogy is Assignment. Learning via Smartphone will be incomplete if assignments cannot be conducted and submitted using the phones. The attributes covered for this element were the possibility of submitting text files & image files, conduction of simultaneous research while working on the assignment, easiness in submissions, and finally generating a report for plagiarism. The assignment is found to be comparatively sensitive segment as most of the students were unaware of generating report for plagiarism, there were highest unsure responses for this attribute (86%). Simultaneous research possibility has also shown unfavorable response of 84%, most probably due to the disturbing environment that comes along with smartphones like receiving calls, pinging emails and messages. It is also not easy to secure or take important notes on Microsoft word or work on excel files. Collecting data and analysing data are probably not very friendly task on mobile. The most noteworthy results are the favorable responses of the possibility of text submission (68%), possibility to submit images (62%) and easiness in assignment submission (70%). It can be concluded that mobile makes submission of assignment easy but unsure about the credibility of submission as plagiarism results are perplexing.

Revision, the fourth element of SMART pedagogy has brought new light to the research. Facilitating games has shown unexpectedly very high favorable response of 92%. It is evident that students of millennial generation find pleasure in an intense and fun-loving experience of playing games on mobile in their day to day life. Educators must try to tap this factor into their pedagogy. This may bring fun factor in

education and may enhance the learning experience. It has been found that Smartphones facilitates revision through various quiz applications. These quizzes have shown individual satisfaction result of 66%. However, this score is comparatively lower than games. Perhaps students seek and love to have fun and competition in education as well. Overall understanding of revision content has derived a very low score of just 34% favors, again proving that smartphones are not the wholesome package for revision but can be used as a supplementary learning tool.

The most disappointing results among all elements were reflected for using Smartphones for Testing. The attributes that were studied for this element were inclusive of easiness of solving selective response questions and cognitive response questions, convenience in conducting and attempting exams on Smartphones, accessibility to instant results, and prevention of cheating. Whereas overall result is not satisfactory, easiness in solving selective response questions got liking of 62% and reduction in exam stress levels got liking of 42%, both attributes are honorable for testing students via smartphone. Attempting the selective response questions' attribute result strengthen the conclusion of bite learning. And exam stress level attributes learning stamps it as a fun learning. However, smartphones does not provide suitable applications to the testing organization to control cheating. In short, it can be concluded that smartphones cannot be used for testing as it does not measure up for sincerity and credibility factors. In future, safeguards' app may bring these results at an acceptable level.

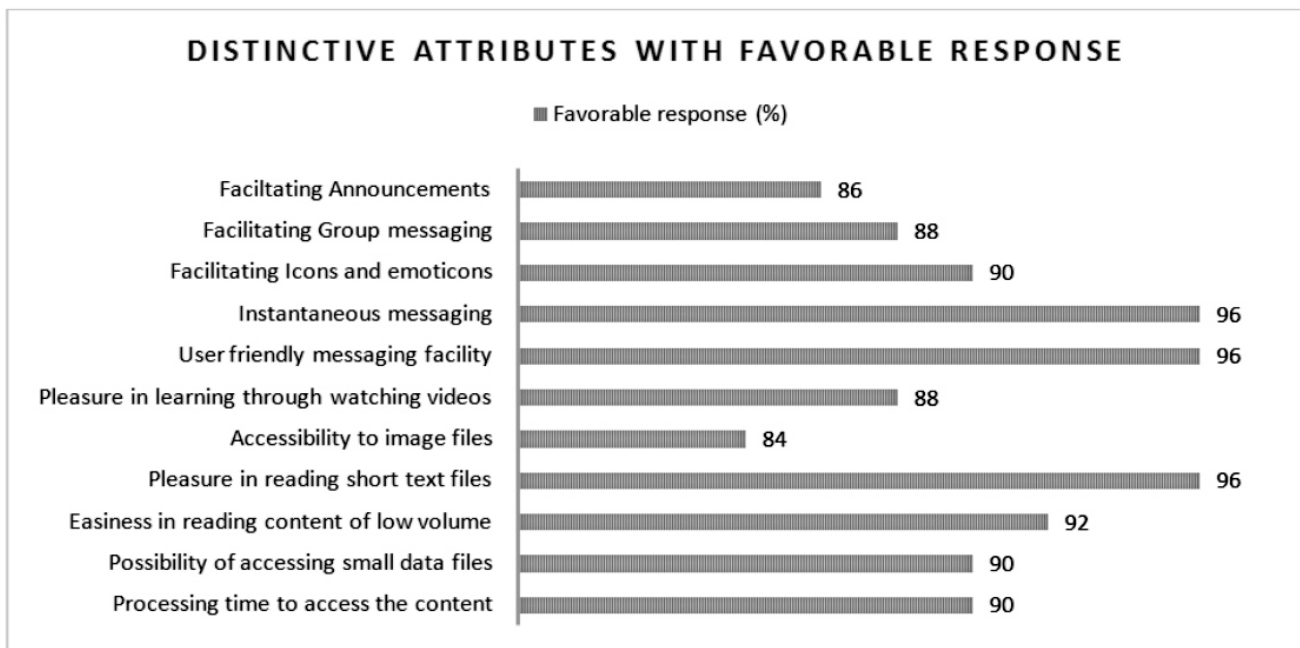


Chart 1: Distinctive attributes with favorable response

As depicted in Chart 1, there are several distinctive attributes for different elements of SMART pedagogy. The favorable response for these attributes was above 75%. Comparing these five elements of SMART pedagogy, it is found that smartphones are most suitable for Messaging facility as it received the highest average score of favorable response (78%), followed by Sharing content (63%), and it will be safe to conclude that Smartphones are not yet ready for testing students (23%) and grading them just through phones.

Conclusion and Research Implications

Conclusion

In general, students believe that smartphone learning motivates them in learning. Messaging and sharing contents through smartphone empowers them with speed, user-friendly learning environment whereas for the successful test smart phones are not yet the ethical and sincere solutions. Researchers do believe that smartphones should be explored in depth for blended learning setup. Though it cannot be a sole medium for learning, however, it could be the superlative supplement to the conventional or modern learning tool. Students do believe that submitting and completing assignments using smartphone is extremely effective and that assessments could be designed exclusively for smartphone application. This research gives new flicker to the revision lessons as the smartphones have

been found to be convenient tool in conducting quizzes and games for revision purpose.

Limitations

As with all research the exploratory research contained in this paper has a number of limitations. Firstly, the sample of students and faculty was very small, the students were exclusively female, and the research was conducted within a cultural setting that is quite unique. Secondly, results are based on qualitative data which are abstract and subjective. In addition, the expert panel opinion for the attributes was not recorded because of cultural reasons. Since observation notes were taken by the researcher, it is obvious that a certain degree of subjectivity exists. In fact, it would have been sort of objective if it had been decided by the panel of observers rather than researchers. Furthermore, the range of learning management system and apps that students used were limited and related only to a small number of learning outcomes.

Future research

Limitations of this study have opened the door for some future researches related to smartphone learning. Future research should address some of the flaws identified above. Additionally, future research may focus more on the areas of the curriculum most suited to being taught and practiced using smartphones. This research has also reflected the

technological limitations that impair learning using smartphones. A future study may be conducted to overcome these challenges and limitations. The effectiveness of smartphones in a flipped classroom or online lesson delivery may also be of interest to researchers. Also, acquisition of skills to use a smartphone as a learning platform and creation of smartphone apps appropriate to reach the curriculum learning outcome could be the new-fangled lines of research.

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