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Review Article

Trend of using of smart phones by medical students

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Abstract: Medical education has undergone major changes from teacher centered to student centered, from discipline based to integrated, from hospital based to community based curriculum and is more focused on formative learning. Medical professionals are looking at aids to cope with the information overload. The processing capability of desktop and the communication attributes of the mobile phone has merged together to create a device which offers limitless access to medical resources. Physicians prefer a Smartphone, which has multiple functions to offer. They are making increasing use of mobile devices in support of their clinical practice and professional development, and their profile in medical education is also growing.

Keywords: Medical education, communication, Smartphone, learning.

INTRODUCTION

Definition

One of the simpler definitions describes smart phones as "Advanced mobile communications and portable computation are now combined in handheld devices called "smart phones", which are also capable of running third party software"[1].

Another definition describes "mobile computing device" as a handheld device which provides constant connection to the internet via email, text messaging, video conferencing and social networking software, often integrated with additional functions such as podcasts and video. This definition includes all manner of smart phones such as the iPhone, blackberry, Samsung and devices such as I pad but excludes desktops, net books and laptop computers [2].

Factors determining it: Medical education has undergone major changes from teacher centered to student centered, from discipline based to integrated, from hospital based to community based curriculum and is more focused on formative learning [3].

It was found by Cisco systems that the number of hand held cell phones is more than the total human population on earth [4]. Medical professionals are looking at aids to cope with the information overload. The processing capability of desktop and the communication attributes of the mobile phone has merged together to create a device which offers limitless access to medical resources. Besides they are small and handy, can save large amount of data, and has a battery that lasts for hours [5]. Physicians prefer a Smartphone, which has multiple functions to offer [6]. They are making increasing use of mobile devices in support of their clinical practice and professional development, and their profile in medical education is also growing [7, 8].

Some medical schools are formalizing their learner's educational use of mobile technologies [9]. A survey suggests the number of medical applications currently available is at least in hundreds, if not in thousands [10].

Nature of the trend

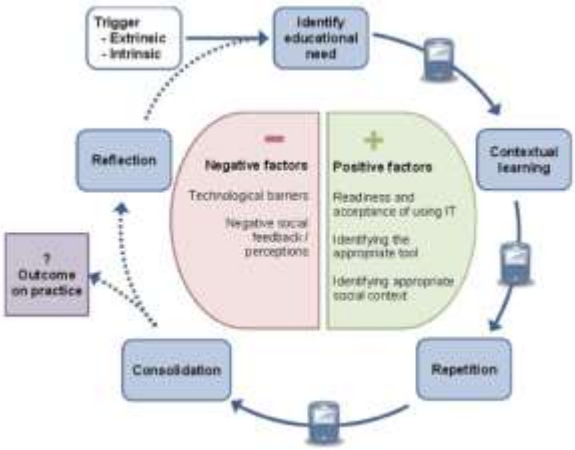
Objectives

1. To integrate technology into learning
2. To provide an instant access to information in order to solve or manage problems faced in the clinics
3. To facilitate communication between colleagues and preceptors
4. To enhance both patient care and learning
5. To increase the potential for patient education
6. To provide a mobile access to patient records [2]

METHODS

A model is proposed to explain the conceptual framework by Davies et al. based on their study on how information resources on cell phones can contribute to learning for undergraduate clinical students. They proposed a model to explain that. Educational need is recognized by an external or internal trigger which

leads to the use of mobile phone at clinical sites which further enables learning to take place. Like any cycle it's affected by positive and negative factors. Broken arrows show areas where further research is needed [11].



ADVANTAGES

Ellaway [12] has reviewed the advantages as perceived by medical students of Northern Ontario School of Medicine, Canada in 2014 specifically concerned with the use of smart phones and tablets from Apple Inc.:

- Portability was seen as one of the most important advantages. They felt that mobile devices can efficiently augment various other devices like laptops and pagers.
- Fast access to information on the internet can be accesses when required. Timely access results in learning in context. This supports situated cognition which argues that learning is more likely occur where knowledge is gained and applied in everyday situations. The situated nature of learning requires knowledge to be practiced in social and collaborative contexts.
- Access to powerful applications and to multimedia resources results in consolidation of knowledge through repetition, when the students look up to confirm what they already know is right. This is well suited to support inquiry based learning.
- Efficient use of time as they don't have to waste time or keep things for later. They can use it for note taking, document and calendar viewing, to view the curriculum online etc.,
- Flexible communication with patients, team mates and preceptors.
- The ability to learn while communicating and contributing at a distance with other learners supports the concept of distributed cognition which explains the process of interaction between people and technologies.

Many of these advantages are supported by Wallace *et al.*[2] following the study conducted in Medical school of University of Alberta, Canada based on the perceptions of student, faculty, interns and clinicians. They have suggested how these devices have much potential for patient education and mobile access to patient records. They explain how smart phones might be better than the traditional e-learning and can be very helpful in decision making with various clinical training sites.

DISADVANTAGES

Ellaway [12] has reviewed the disadvantages as perceived by medical students of Northern Ontario School of Medicine, Canada in 2014 specifically concerned with the use of smart phones and tablets from Apple Inc. The students were worried that:

- They would become (or were becoming) too dependent on their mobile devices.
- It would distract them from the patient centered approaches and patient care. The patients might not like the idea of learners being on the phone while treating them.
- Having too many devices could lead to problems of carrying/ losing them. It's better to use their own personal device for learning rather than carry another device given from the college for learning purpose.
- The speed at which newer models superseded their devices, particularly when they saw the following class being issued with a better device than they had received.
- Negative impression created due to using their devices in the presence of their preceptors. As many of them were suspicious of students using it for a far different purpose rather than learning.

Wallace *et al.* [2] reflect on some more disadvantages. Unexpected effects observed in their study included distraction and lack of deeper learning. They raised their concerns over professionalism and privacy of patients. **Parsons** suggests how "Just In Time learning" is called "Performance support" and not as learning. He also throws light on how this type of learning shifts from learner-centric to device centric where student is depending on the device without any self learning and knowledge [13].

Pitfalls in implementation

The difficulties in implementation mainly come as an adaptation to the change and a lack of regulatory body to monitor it.

- **Davies** *et al*. [11] identifies the lack of solid outcomes showing that learning is improved by the intervention of smart phones, and stresses on the expenditure of such a project. There are the obvious costs for the devices,

apart from the costs of repair and providing technical support, usage monitoring and content administration.

- Also they demonstrated that only a few students really use their device for learning so providing it to all is a waste.
- **Ellaway** [12] demonstrated how technical support was a problem, especially when technicians fail to resolve an issue and the learner has to contact the manufacturer.
- **Wallace** [2] describes how dislike of technology and practical issues like how phone would just freeze, can be a barrier for learning. He suggests that the barriers could be overcome by the input of learners and institution.
- **Arkell** [10] stresses on the point how there is no overarching body regulating the creation and dissemination of medical software, issues such as the content quality and accuracy are not being fully addressed.

Guidelines for implementation

Being able look up information is likely to become a vitally important skill for medical practitioners in near future.

Wallace [2] elaborates on some:

i. He says that the use of smart phones in learning may lead to quite a few professional and ethical dilemmas. The etiquette of incorporating smart phones into their learning and patient care without harming their relationship with the patient has to be instilled.

ii. A need for change in attitude, behavior and approach was paramount, from the students to clinicians and patients. This was achieved in their study by encouragement by the clinicians and making students realize the authentic learning nature of the tool.

iii. He also highlighted the importance of making it a more formalized part of the curriculum and provide institutional support, encouragement and technical support.

Davies [11] has proposed a detailed implementation and management of this technology in the curriculum:

i. There needs to be equity among students whether it's the type of phone and its usage. Barriers can be overcome with enough technical support and encouragement from the preceptors.

ii. New software that provides information like time and duration of access, nature of content viewed has to be installed in the phone. This will allow us to investigate the resource usage and situational context (home, hospital, university).

iii. In developing resources for smart phones, design is paramount and should be relevant to medical education which is approved by a governing body. Content has to be modified so that it can be easily viewed on a small screen and minimizes the navigation issues.

iv. Integration with other aspects of e-learning facilities, such as an online question bank and a e-portfolio, online curriculum could be considered.

CONCLUSION

The future of smart phones in medical education has pros and cons. With efficient guidelines and development of applications and software, this technology can serve as a major pedagogic change.

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