

# Physiotherapy Students' Perception on Learning through Smartphone: A Pilot Study

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## Abstract

**Objectives:** Smartphone technology has transformed our lives in many ways and it is also reflected in learning. The objective of this pilot study was to find out the physiotherapy students' perception on the use of smart phone and medical related applications (apps) as a learning tool in a private university in Malaysia. **Methods:** The method used in this study was an online survey. The link for the online survey form was posted on the Facebook page of the university Physio-Club and the participation in the survey was voluntary. The students have to answer close ended questions related to the ownership of the smart phone; frequency, duration and purpose of smart phone and medical related apps use for their learning, in university and clinical environment. Open ended questions were also used to explore the students' perception about the usefulness of the applications, and their recommendations. **Results:** 68 students responded to the questionnaire of which 69.1% and 30.9% were female and male students respectively. Google Android was the most popular among the students (61.8%) followed by iPhone (25%). The majority (63.2%) of the students possessed 1 to 5 medical related apps in their Smartphone. Their preferred use was, for educational learning (79.4%) and revising (74.6%), with less usage in clinical ward (30.2%) and clinic (20.6%) environment. Their usage frequency was once or twice a day with duration lasting between 1 and 10 minutes, in university as well as in a clinical environment. They often used the smart phone and applications to find out the disease diagnosis/management and they found it most useful due to easy accessibility of information. **Conclusion:** This pilot study showed that most of the physiotherapy students use medical related apps in their Smartphone for learning activity, and they mostly recommended dictionary and physiotherapy apps.

**Keywords:** Physiotherapy Students; Smart Phones; Medical App; Survey.

## Introduction

A mobile device which has advanced capabilities beyond ordinary mobile phone is called a smart phone. Smartphone technology has transformed our lives in many ways and its influence can be seen in various fields like medicine [1], teaching and learning [2]. Smartphone applications (apps) have changed the way people do their jobs. Since the introduction of medical related applications, smart phone has been used widely in the medical field for assessment [1, 3] and management of patients [1, 4, 5]. It is also used to educate the patients about health related conditions and self-management of chronic diseases [1]. The use

of a smart phone for learning is also increasing and various studies explored the use of a smart phone among university students [6-8]. The increasing number of smart phone apps brings the solution for more complex problems in the student's hands and it's no wonder that smart phones is popular among the student community. Its use is also echoed in the medical students' community for learning.

Previous studies explored the usage of smart phone among medical students and their use for learning [9]. Medical students are using smart phone and medical related apps for learning not only in university campus but also in the clinical setting [10]. Likewise, smart phone and medical related apps usage among health science students especially physiotherapy students has to be assessed.

With the use of body measurement Smartphone apps students can measure the patient joint angles accurately without any sophisticated equipment [3]. Recent research has proved that posture and gait assessment can also be done with a Smartphone app [11, 12]. Smartphone apps can also be used for fall

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prevention [13], activity monitoring [14], and providing treatment like balance training [15]. As rehabilitation related apps are increasing we presume that physiotherapy students also using Smartphone for their learning in academic as well as in a clinical setting. Even though previous studies analyzed the use of Smartphone among medical students, the physiotherapy students' perspective was not analyzed specifically, especially in Malaysia. Hence, this pilot study is planned to find out the use of Smartphone and medical related apps among physiotherapy students which will help us to transform our course delivery in teaching. So the main objective of this pilot study is to find out the physiotherapy students' perception on use of smartphone and medical related apps for learning in a private university in Malaysia.

**Methods**

The method used in this study was a descriptive online survey. The questionnaire used in this study was adopted and modified from the questionnaire used by Payne et al [10], with permission. The original questionnaire was tested with 20 physiotherapy students and modified accordingly. Then the 12 item questionnaire was created in the Google docs ([www.docs.google.com](http://www.docs.google.com)) and the link for the online survey form was posted on the Facebook page of the INTI International University Physio-Club for 3 weeks. The participation in this survey was voluntary. All the physiotherapy students of INTI International University are the members of the INTI Physio-club page on Facebook. Hence, anyone from year 1 to year 4 can access and answer the questionnaire. When they click the online survey form link on Facebook, a separate page in Google docs will open with informed consent and the questionnaire. After reading the informed consent if the student wishes to continue,

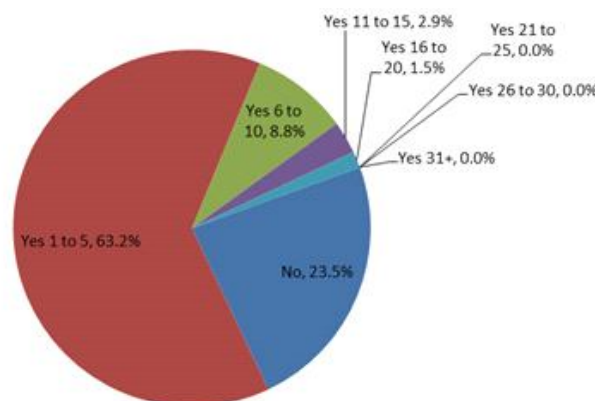
then they have to answer close ended questions related to their gender, current year of study, ownership of the Smartphone and medical related applications, frequency, duration and purpose of smartphone and medical related apps use for their learning, in university and clinical environment. The usage of university linked application among students' is also explored with a closed ended question. Open ended questions were also used to discover the students' perception about the usefulness of the applications, and their recommendations. Please find the questionnaire in the appendix.

After 3 weeks the link was closed and the numerical data were analyzed using Microsoft Excel (MS office 2010), Statistical Package for Social Sciences (SPSS version 13) and online tool Simple Interactive Statistical analysis (SISA). The descriptive statistics were analyzed for frequency and percentage by entering data from Google docs into Microsoft excel. The inferential statistics for non- parametric Fisher's Exact Test was run using SPSS and SISA as appropriate. The response to the open ended questions were organized into key themes and discussed in the results.

**Results**

Of the undergraduate physiotherapy students surveyed 68 students responded, out of 156 registered physiotherapy students; with a response rate of 43.6%. Out of 68 responses 69.1% (n=47/68) of the students were females and remaining 30.9% (n=21/68) were males. The recorded responses were from 4<sup>th</sup> year (33.8%), 3<sup>rd</sup> year (44.1%), 2<sup>nd</sup> year (22.1%) and no first year student answered the questionnaire. Google Android (61.8%, n=42/68) was the most popular smartphone followed by iPhone (25%, n=17/68) and other smartphone (13.2%, n=9/68) among physiotherapy students.

**Fig. 1:** Percentage of physiotherapy students owning medical related smartphone apps (n=68)



The majority of the students (63.2%, n=43/68) owned 1 to 5 medical related apps in their smartphone. Whereas 23.5% (n=16/68) students did not own any medical related apps in their smartphone. There was no association between gender and ownership of medical related apps (Fisher's Exact Test, P=1.000). Similarly no association was found between the type of phone and ownership of medical related apps (Fisher's Exact

Test, P=0.17688). The students used mostly smartphone for educational learning (79.4%, n=50/68) and educational revision (74.6%, n=47/68), and their usage in the clinical area was limited representing 30.2% (n=19/68) in a ward environment and 20.6% (n=13/68) in a clinic environment. The figure 2a and 2b shows the frequency of usage of smartphone and medical related apps in university education and clinical education.

Fig. 2 a: University education

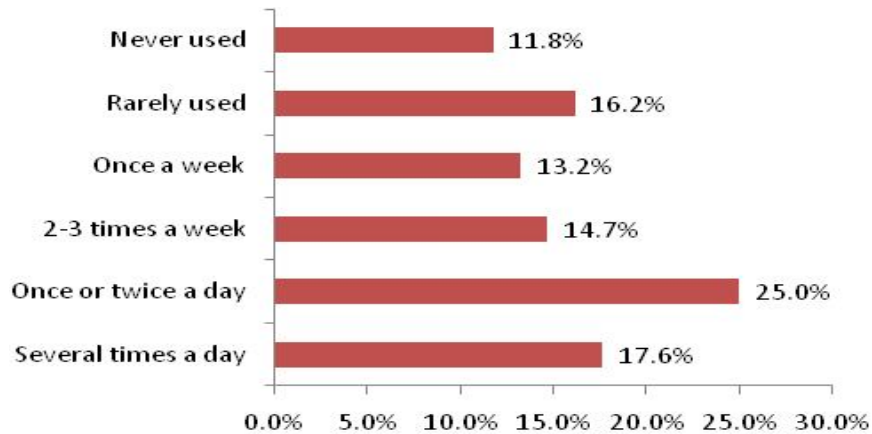
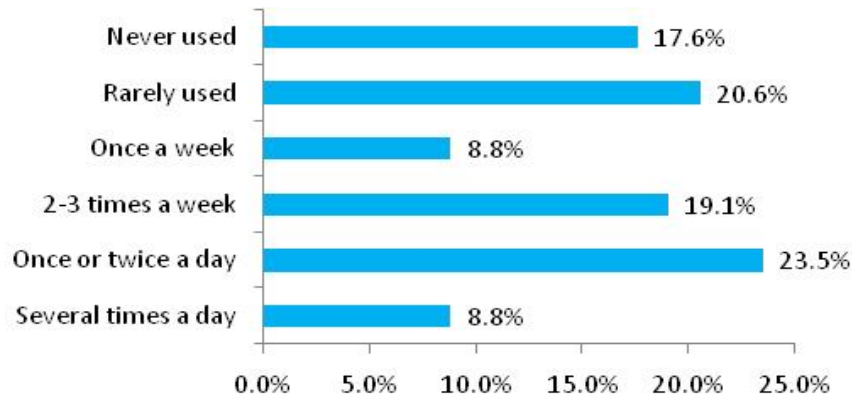


Fig. 2 b: Clinical education



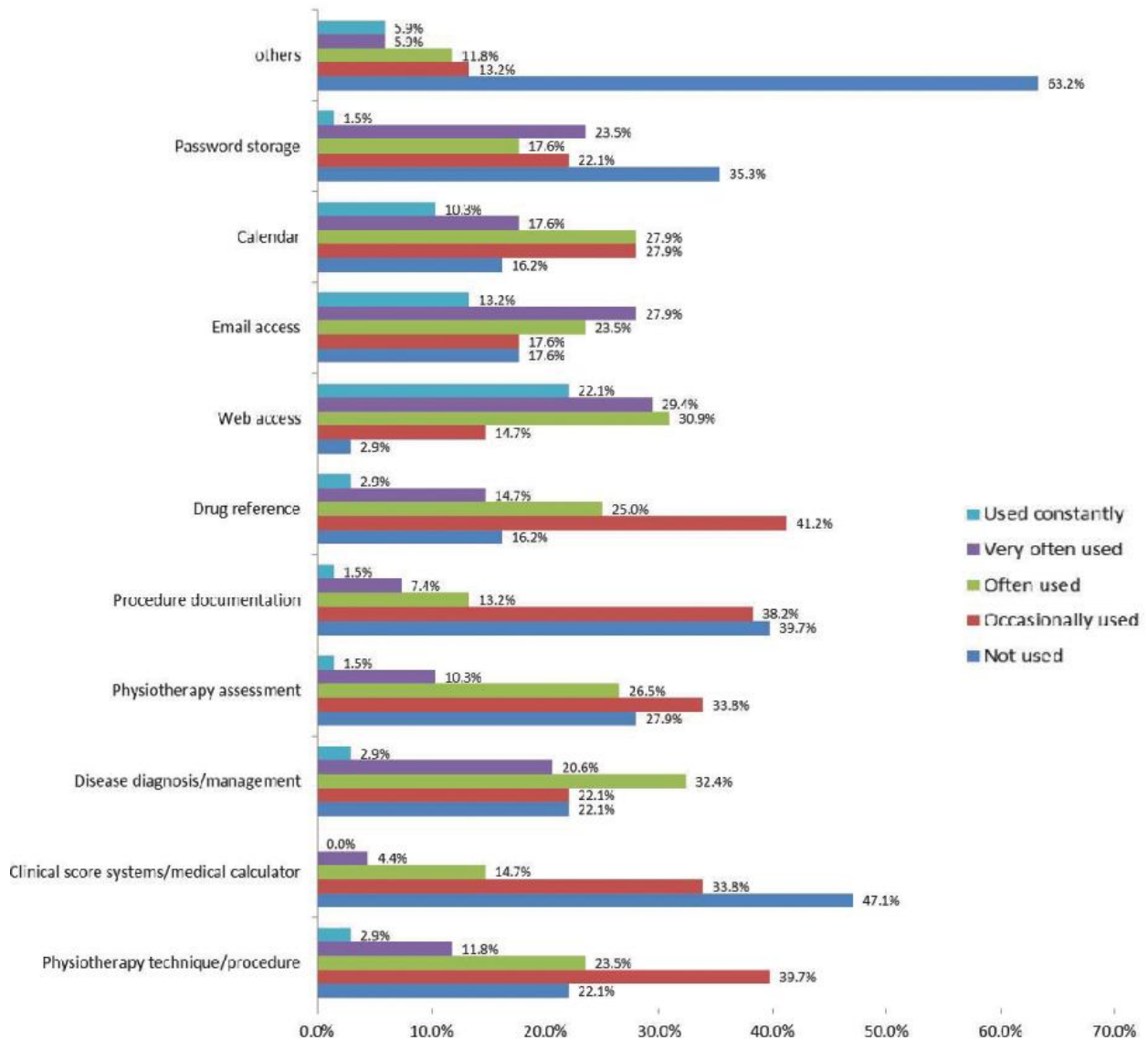
The purpose and frequency of smartphone and medical related apps usage as reported by the students is given in the figure 3. The students stated other uses such as notes, presentation slides, photo, BMI calculator, stopwatch, games and social media (Facebook, Twitter, YouTube, WhatsApp). Daily use (in minutes) of smartphone and medical related apps among physiotherapy students is reported in the figure 4a and 4b. Out of 68 responses 61.8% (n=42/68) of students like to use smartphone apps specific to their university and 38.2% (n=26/68) did not like to use it.

Daily use (in minutes) of smartphone and medical

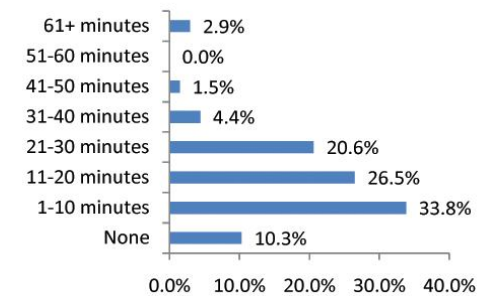
related apps among physiotherapy students is reported below in figure 4a and 4b. (n=68).

More than one third of the students' (n=28/68) responded to the open ended questions about their comments on the use of smartphone and medical related application in university/clinical environment. 9 participants stated that apps are easily accessible and convenient to use. The students also stated that it is helping to get further information on the lecture, assisting to learn technology with education and helping to revise the topic. Four students were not sure about their answer to this question.

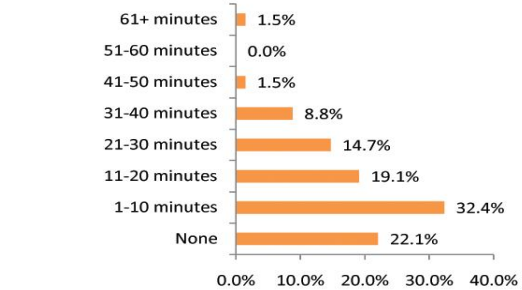
**Fig. 3:** The purpose and frequency of smartphone and medical related apps use among physiotherapy students (n=68)



**Fig. 4a:** Daily use in university setting



**Fig. 4b:** Daily use in clinical setting



The physiotherapy students recommended following apps: human anatomy atlas, time tabling, Medscape, PubMed, BMI calculator, disease dictionary, physiotherapy exercises, goniometer, medical diagnosis, medical dictionary, anatomy dissection, webmd, Google and more physiotherapy related apps.

The most useful features of smartphone and medical related apps described by physiotherapy students was drug information and disease diagnosis, medical dictionary with diagram or picture, precise diagrams and explanations, convenient and quick access, summarized information, quick reference, easy to use, and reliable source of information.

## Discussion

This pilot study discovers the smartphone and medical related apps usage among physiotherapy students for the first time in Malaysia. Understanding the perception of students about smartphone in learning will help academicians to modify their teaching and course delivery in an exclusive way. It will also help smartphone companies and apps developers to design and modify their software according to consumer preferences.

Even though only one third of the students responded to the questionnaire, all of them owned a smartphone. So the smartphone usage is high among physiotherapy students. This trend is supported by Sedek et al [16] in their study, which reported high amount of the smartphone, tablet and laptop ownership among undergraduate students from Malaysian Technical Universities. Similarly research studies by Kim et al [8] from Korea and Alfawareh HM, Jusoh S [6] from Saudi Arabia stated the peak use of a smartphone among university students.

Google Android phone (61.8%) was popular among physiotherapy students in Malaysia. On the contrary Apple iPhone was the most popular smartphone among Canadian medical students and residents [9], and United Kingdom medical students [10]. The slightly cheaper price of android phone when compared to the iPhone may be influencing consumers to buy android phones in a developing country like Malaysia.

63.2% of the Malaysian students owned 1 to 5 medical related apps in their smartphone which is higher when compared to United Kingdom medical students and junior doctors as reported by Payne et al [10]. However ownership of more than 5 medical related apps is less among Malaysian physiotherapy students when compared to UK medical students. This study does not show any significant association between types of smartphone and ownership of medical related apps which is contrary to the UK study. As medical related apps on Apple App store and Google Play store are numerous with identical functionality, the apps use by both types of smartphone (iPhone and Android) users is almost similar. Only 25% of Malaysian physiotherapy students used smartphone and medical apps, once or twice a day for their university education, which is less than Canadian medical student use(9). As the physiotherapy students in the pre-clinical years (second year) had limited clinical posting, the overall use in clinical education for once or twice a day was slightly lower than university education use.

The percentage of Malaysian students using smartphone several times a day for medical purpose

is less; 11.8% and 17.6% of students never used in their university education and clinical education respectively. This displays that physiotherapy students are using their smartphone for medical related educational purpose, but not very frequently.

A review by Ozdalga et al [1] stated many uses of smartphone in medicine. In that he reported the use of a smartphone for patient care and monitoring in various fields like neurology and rehabilitation. The results from this current pilot study reveal that physiotherapy students are often used smartphone for disease diagnosis/management, but they used occasionally for physiotherapy assessment and procedures. But they used very often for web access and email access. Regarding the duration of use, 1-10 minutes per day was reported by most of the Malaysian students. Although this duration is less, it is understandable that the current generation of students wants to enjoy their time by using social media and email which can be seen through peak usage of smartphone for web access and email access in this study. Hence; the duration they use their smartphone for medical related apps is limited.

For open ended questions, most physiotherapy students reported that smartphone is very convenient to use and easy to access and they preferred dictionary and physiotherapy related apps. More than half of the Malaysian students (61.8%) are using university linked apps in their smartphone. So the university has to consider this and make the app more attractive and useful for the students.

No first year students answered the questionnaire. It may be due to lack of awareness of medical related apps use as they just entered the course. Because of this we do not know the first year physiotherapy students' perception about using smartphone for learning.

## Limitations

This pilot study was conducted in small groups of students in one university, which may not reflect the larger physiotherapy student population in Malaysia. So studies with larger samples and in different locations have to be conducted in order to confirm the results reported in this study.

These study samples are younger generation students who are tech savvy. So the usage by students does not reflect the usage in the physiotherapist community. Hence practicing physiotherapist also has to be included in future studies.

No first year students answered the questionnaire. Hence the result may not reflect the complete picture because first year students do not have clinical posting

which may affect the result of clinical setting usage.

### Conclusion

From this study it is clear that physiotherapy students are using smartphone for their learning in university education as well as in a clinical setting.

But their preference concerning the type of smartphone varies from western country students. Physiotherapy students prefer to use medical related apps in their university education for learning, but their usage in clinical setting is less. The increasing trend of smartphone and medical related apps use among students urges physiotherapy academicians to incorporate smartphone technology in their teaching. As physiotherapy students desiring more

### Appendix

#### \* Required

1. Please state your gender: \*

**Mark only one oval.**

- Male  
 Female

2. Please state your current year of study: \*

**Mark only one oval.**

- 1st year  
 2nd year  
 3rd year  
 4th year

3. Do you own an application smartphone? \*

**Mark only one oval.**

- No  
 Yes-iPhone Yes-Google Android Yes-  
 Other smartphone

4. Concerning your smartphone, do you own medical related applications? \*

**Mark only one oval.**

- No  
 Yes 1 to 5  
 Yes 6 to 10  
 Yes 11 to 15  
 Yes 16 to 20  
 Yes 21 to 25  
 Yes 26 to 30  
 Yes 31+

5. Please indicate how you use smartphone and medical related app:

(You may choose more than one answer)

**Check all that apply.**

- Education-revising
- Education-learning
- Clinical-ward environment
- Clinical-clinic environment

6. Please estimate the frequency you utilize your smartphone and medical applications during clinical attachment compared to university educational time. \*

(One of the below options chosen for the categories: 'university education' and 'clinical attachment')

**Mark only one oval per row.**

	Several times a day	Once or twice a day	2-3 times a week	Once a week	Rarely used	Never used
University education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinical education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. In relation to the following types of applications, please indicate how often you use them during educational and/or clinical hours: \*

(choice of 'not used', 'Occasionally used', 'often used', 'very often used' and 'used constantly' for each of below. Please select your choice.)

**Mark only one oval per row.**

	Not used	Occasionally used	Often used	Very often used	Used constantly
Physiotherapy technique/Procedure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinical score systems/medical calculator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disease diagnosis/management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physiotherapy assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Procedure documentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drug reference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Web access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calendar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Password storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please detail in comment box)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please detail in comment box if you have selected Other

8. Please estimate the time you spend per day (in minutes) using smartphone and medical related applications related to clinical and educational activities \*

(One of the below options chosen for the categories 'education' and 'clinical', please circle your option)

**Mark only one oval per row.**

	None	1-10 minutes	11-20 minutes	21-30 minutes	31-40 minutes	41-50 minutes	51-60 minutes	61+ minutes
Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Would you utilize a smartphone app specific to your university? \*

**Mark only one oval.**

Yes

No

10. Please detail any further comments you have regarding your use of medical related smartphone application in the university and/or clinical environment:

11. Which specific apps would you recommend?

12. What features do you find most useful in a medical related app?

If you would like a summary of my findings, please fill in your name and email address on this form and I will be happy to forward my findings to you when the study is completed.

physiotherapy related apps, the app developers including university have to consider the students' opinion for their future business and development.

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