

Mobile Devices and Learning: Student Perspectives and Inclination at South African Higher Learning Institutions

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Abstract

The increasing use of mobile devices in business extends to academia, posing challenges for educators amid the dynamic landscape of teaching and learning methods. Educators must adapt to these changes to meet students' technology-driven learning needs. This study investigated students' perspectives on mobile device usage and their inclination to integrate the use of mobile devices into learning activities. In a self-administered LimeSurvey questionnaire, students demonstrated a positive attitude towards mobile device use in learning and expressed optimism about its future potential. Exploratory factor analysis identified three key factors that influence mobile device selection for learning: behavioural lifestyle intentions, subjective social norms, and attitude and expectations. A multiple linear regression analysis revealed that these factors are predictors of the use of mobile devices for study and learning purposes. Institutions and educators should leverage these insights to enable students to acquire mobile devices, either as part of study material or through loan schemes or financial assistance.

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INTRODUCTION

Magda, Capranos and Aslanian (2020) found a marked rise in students who opt for alternative devices rather than personal computers and laptops for online coursework. Given the swift pace of technological advancement and the widespread adoption of mobile devices among consumers and students, along with the growing acceptance of mobile devices as the preferred tools for online learning and related educational activities (Clinefelter, Aslanian, & Magda, 2019), this trend is hardly surprising. Engaging with students who use mobile devices can lead to valuable insights as to their preferences, opinions and inclination to use mobile devices in their learning activities.

The increasing popularity of mobile devices among consumers suggests a natural trend for more students to utilise mobile technology in their learning endeavours (Park, 2011). Advances in mobile device technologies are primarily aimed at making communication and interaction between different groups possible. These developments in mobile device technology have brought about major changes in society and diverse cultural contexts, particularly in the way we interact, on all levels, be it personal, business or learning. Users of mobile devices, including students, use these devices for a myriad of purposes such as translation, reference work, social interaction, access to information, and many more. The era where mobile devices served merely as status symbols has passed; they have evolved into indispensable components of our daily routines. Consequently, there is a growing recognition and integration of these devices into the learning environment.

For educators to evolve beyond traditional teaching methods, they must embrace new techniques, often involving technology (Karim et al., 2020). This necessitates a re-evaluation of programme offerings and delivery methods, aligning them with the needs of the target audience.

Accordingly, this study delves into students' perspectives on and willingness to use mobile devices in their learning endeavours. To achieve this aim, an online survey will be used to collect quantitative data from undergraduate students. The data gathered will be subjected to exploratory and inferential statistical analyses.

Following the introduction, a discussion of the relevant literature on theoretical and empirical studies is given that will clarify and highlight the link between theory and practice. Thereafter, the focus shifts to the research methodology employed in the study and the subsequent data analysis. The findings of the study are then presented, followed by a discussion and recommendations.

Literary Review

Defining a mobile device

In the ever-evolving landscape of technology, where change is constant and rapid, the definition of "mobile device" is continually shifting and will continue to do so as technology advances. Older references to mobile devices typically centred around mobile phones, personal digital assistants, and various alternative devices like video players and MP3 music files. Today, a mobile device is considered akin to a mobile PC, boasting nearly identical features and functions but in a smaller format (PC Magazine, 2020). For the purpose of this study, the term "mobile device" encompasses smartphones, tablet devices, and laptops, aligning with the definitions provided by Ally and Wark (2018) and Gallegos, Gehrke and Nakashima (2019).

Uses of mobile devices in learning

The higher level of accessibility of mobile phones, together with their ability to process information in the wink of an eye, has dramatically increased the use of mobile phones among students. In respect of the execution of learning, it was found that mobile phones are highly regarded, in so far

as they can be used in seminars and presentations in workshops and classrooms. At the same time, they require less space and are easier to carry than traditional laptops, which allows for flexibility, particularly for educators. Consequently, mobile devices are popular among students and educators alike.

It is generally accepted that students employ mobile devices for a myriad of reasons and uses. Pebriantika (2021) points out that students use mobile devices as supplementary tools, for example, to make use of learning material to enhance their learning – these devices complement the learning experience through the availability of additional material and provide alternative models of tuition, thus allowing students more flexibility with regard to how they manage their learning activities. The author points out that students tend to use mobile devices because the devices enable them to access learning materials at any time and any place, and repeatedly.

Mortazavi, Hocann and Davarpanah (2020) suggest that students utilise mobile devices for a multitude of tasks, including but not limited to information searches across different platforms, engagement with various social networks, and the sharing of materials and images. Essentially, students leverage mobile devices for their attributes, such as size, weight, convenience, diverse learning experiences, ease of access to various sources, ease of information retrieval, and multitasking capabilities, regardless of location or time (Anshari et al., 2017). Thomas, O'Bannon and Britt (2014), in Mortazavi et al. (2020), found that students' access to the internet is regarded as the main reason why mobile devices are used in the classroom.

It is apparent from the above discussion that mobile devices offer numerous opportunities and advantages in learning that can be exploited. Various studies on users' experience with, and opinions on, the use of mobile devices have been conducted over the past years.

Students who make use of mobile devices in their academic pursuits generally have a positive disposition towards the use of such devices (Milheim, Fraenza, & Palermo-Kielb, 2021). Many students will consider the limitations of a particular mobile device since these limitations may have an impact on the extent to which they will use that device. It is fairly well-known that mobile devices are used for a variety of reasons, over and above the initial primary objective of such devices. Students use mobile devices for design purposes, engagement, and usability, each of which comes with its own risks and limitations (Eschenbrenner & Nah, 2019; Kumar & Goudnar, 2019; Suartama et al., 2019).

Studies have also shown that students prefer mobile devices that are effective and efficient in their application, which includes, for the main part, their connectivity, embedded technology, and graphic quality. From a student's perspective, the use of a mobile device is largely dependent on its ability to access and engage with the learning material efficiently. Furthermore, the propensity of students to use mobile devices is also linked to the extent to which they can access social media applications. The utilisation of mobile devices is intertwined with their capacity to enable students to interact and creatively generate content, while also facilitating authentic communication (Gikas & Grant, 2013). Alshammari (2020) suggests that students employ applications on mobile devices at a more interactive level to complement and enrich their learning experiences.

METHOD

A quantitative methodology was adopted for the study, and a survey questionnaire was used for data collection. The questionnaire was administered to undergraduate students at a prominent South African institution of higher education through the LimeSurvey platform. Ethical

clearance was obtained from the institution prior to the distribution of the questionnaire. The institution's ICT department oversaw the distribution process, sending an email containing a survey link to students' institutional email addresses. Convenience sampling was chosen for its ease and accessibility in acquiring data. The respondents were asked for their consent, which was duly obtained, before they took part in the survey. The survey focused on e-learning and the utilisation of mobile devices like laptops, smartphones, and tablets. Furthermore, demographic information such as age, gender, and academic year was collected through the questionnaire.

The sample comprised 660 respondents, with 30.2% (n = 199) identifying as male, 65.8% (n = 434) identifying as female, and 2.4% (n = 16) choosing not to specify their gender. In respect of age distribution, the majority (39.7%, n = 262) of the respondents were aged 19 to 30 years, followed by those aged 31 to 40 years (30.3%, n = 200), with a minority (6.4%, n = 42) aged 51 years and above. Additionally, 29.8% (n = 197) of the respondents were in their third year of study, followed by 25.8% in their first year and 20.3% in their second year. A smaller portion (10%, n = 66) of the respondents had been studying at the institution for four years or longer. An analysis was conducted in SPSS 28 (Statistical Package for the Social Sciences),

focusing on basic descriptive statistics and frequencies. Furthermore, a between-group analysis of variance (ANOVA) was performed to explore variances in i) age; ii) year of study, and iii) gender regarding the utilisation of mobile devices. The findings from all analyses are detailed below.

RESULTS AND DISCUSSION

Results

The results are presented in two main sections. The first section focuses on the sample's opinion on mobile devices, together with the findings from the exploratory factor analysis (EFA). The second section focuses on the different ways in which mobile devices can be used for learning purposes, alongside the results from the different analyses of variance, which examined discrepancies between various variables.

Opinions on mobile devices (laptops, smartphones, and tablets)

Table 1, displayed below, illustrates the degree of agreement among participants regarding their perspectives on the utilisation of laptops, smartphones, and tablets for studying and learning (question 5 in the survey). The participants were requested to indicate their level of agreement with each statement, ranging from *strongly disagree* (1) to *strongly agree* (5).

Table 1. The utilisation of mobile devices (smartphones, laptops, and tablets) for studying and learning

	Statement	Level of agreement					Mean (<i>M</i>)
		Strongly disagree (1)	→			Strongly agree (5)	
		n (%)	n (%)	n (%)	n (%)	n (%)	
5.1	Using a mobile device is beneficial.	9 (1.4)	6 (0.9)	62 (9.8)	194 (30.6)	363 (57.3)	4.41
5.2	Using a mobile device is good.	13 (2.1)	17 (2.7)	94 (14.8)	194 (30.6)	316 (49.8)	4.24
5.3	Using a mobile device is pleasant.	18 (2.8)	28 (4.4)	123 (19.4)	219 (34.6)	245 (38.7)	4.02

5.4	Using a mobile device is helpful.	7 (1.1)	6 (0.9)	71 (11.2)	228 (36)	322 (50.8)	4.34
	Lecturers that are	19	17	206	210	181	3.82
5.5	important to me, think that I should use it.	(3)	(2.7)	(32.5)	(33.2)	(28.6)	
5.6	It is expected of me to use it.	14 (2.2)	15 (2.4)	73 (11.5)	238 (37.5)	294 (46.4)	4.24
5.7	I feel under social pressure to use it.	184 (29)*	214 (33.8)*	126 (19.9)	63 (9.9)	47 (7.4)	2.33*
	Lecturers that are	25	41	194	213	161	3.70
5.8	important to me want me to use it.	(3.9)	(6.5)	(30.6)	(33.6)	(25.4)	
5.9	I am confident to use it.	6 (0.9)	6 (0.9)	63 (9.9)	185 (29.2)	374 (59)	4.44
5.10	For me to use it, is easy.	5 (0.8)	14 (2.2)	57 (9)	159 (25.1)	399 (62.9)	4.47
5.11	The decision to use it is beyond my control.	71 (11.2)	120 (18.9)	171 (27)	141 (22.2)	131 (20.7)	3.22
5.12	Whether or not I use it is entirely up to me.	93 (14.7)	128 (20.2)	120 (18.9)	150 (23.7)	143 (22.6)	3.19
5.13	I expect to use it.	9 (1.4)	18 (2.8)	100 (15.8)	270 (42.6)	237 (37.4)	4.12
5.14	I want to use it.	13 (2.1)	25 (3.9)	87 (13.7)	210 (33.1)	299 (47.2)	4.19
5.15	I intend to use it.	9 (1.4)	20 (3.2)	92 (14.5)	223 (35.2)	289 (45.7)	4.21
5.16	Using a mobile device fits well into my lifestyle.	11 (1.7)	29 (3.2)	79 (12.5)	217 (34.2)	298 (47)	4.20
5.17	Using a mobile device fits in well with how I like to learn.	16 (2.5)	39 (6.2)	101 (15.9)	190 (30)	288 (45.4)	4.10
5.18	Using a mobile device is a necessity in today's world.	4 (0.6)	5 (0.8)	43 (6.8)	162 (25.6)*	420 (66.2)*	4.56*
5.19	Using a mobile device is an important source of information for me.	2 (0.3)	8 (1.3)	54 (8.5)	196 (30.9)	374 (59)	4.47

A total of 29% (n = 189) respondents “strongly disagreed” and 33.8% (n = 214) “disagreed” with the statement, “I feel under social pressure to use it [i.e., a mobile device]”. Most respondents disagreed with this statement since it had the lowest mean response ($M = 2.33$) among all the statements. The statement with the highest mean response ($M = 4.56$) was that a mobile device “is a necessity in today’s world”. Two-

thirds of the sample (66.2%, n = 420) “strongly agreed” and 25.6% (n = 162) “agreed” with the statement, resulting in almost the entire sample agreeing that having a mobile device is a necessity. Although most respondents agreed with the latter statement, the remaining statements regarding opinions on mobile devices and their role in studying and learning were generally favourable. This

is confirmed by the mean response for each of the specified criteria (>3).

Determining latent factors

The data underwent common factor analysis by means of principal axis factoring with direct oblimin rotation to explore the underlying factor structure associated with students' intentions to use mobile devices for educational purposes. Factors were extracted through a combination of methods, including the scree-plot test and the Kaiser criterion (eigenvalues greater than one). Following guidelines put forward by Field (2005) and Hair et al. (2010), only items with a factor loading of $\geq .3$ were included in the analysis. To assess reliability, Cronbach's alpha coefficient was calculated for each variable and subscale.

The factorability of the data was evaluated through Bartlett's test of sphericity and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy. The KMO measure yielded a value of .925, and Bartlett's

test of sphericity resulted in a significant value ($\chi^2 (171) = 7489.504, p < .000$), indicating ample intercorrelation and common variance within the data set to conduct a factor analysis.

Utilising the Kaiser criterion, the initial factor analysis of the data revealed the extraction of four factors (eigenvalues greater than 1). In order to further investigate factor structure, a scree plot was utilised to assist in identifying the number of factors to extract. The point of inflection on the screen plot suggested that the extraction of the first three factors is meaningful. The sheer volume of items (or variables) analysed, however, may make it challenging to comprehend the scree plot. To ensure the maximum variance explanation across the various elements in the data, the percentage of variance criterion was also considered. Consequently, four factors were ultimately extracted, resulting in a solution with sufficient primary loadings on each factor and ensuring the interpretability of the extracted factors (table 2).

Table 2. Factor solution after rotation (pattern matrix)

ITEM	Extracted factors			
	1	2	3	4
5.18 Using a mobile device is a necessity in today's world.	.852			
5.15 I intend to use it.	.826			
5.16 Using a mobile device fits well into my lifestyle.	.816			
5.13 I expect to use it.	.809			
5.19 Using a mobile device is an important source of information for me.	.799			
5.14 I want to use it.	.797			
5.9 I am confident to use it.	.659			
5.10 For me to use it, is easy.	.565			
5.17 Using a mobile device fits in well with how I like to learn.	.560		.306	
5.7 I feel under social pressure to use it.		.854		
5.8 Lecturers that are important to me want me to use it.		.521	.390	
5.11 The decision to use it is beyond my control.		.461		
				.346
5.2 Using a mobile device is good.			.811	
5.4 Using a mobile device is helpful.			.782	
5.1 Using a mobile device is beneficial.			.743	
5.5 Lecturers that are important to me, think that I should use it.		.408	.718	
5.3 Using a mobile device is pleasant.			.687	
5.12 Whether or not I use it is entirely up to me.				.891

5.6	It is expected of me to use it.	.371	-
		.401	

The factor analysis of the data resulted in the extraction of four factors. All 19 items exhibited significant loadings (factor loading $\leq .3$) onto these factors and were retained accordingly. Tables 4 and 5 demonstrate that, apart from items 5.11, 5.12, and 5.6, which exhibited cross-loadings onto multiple factors, all items were appropriately grouped within the relevant factors based on considerations of their factor loadings and content.

In the main, items were grouped within the factor most closely aligned with their content. Considering the established theoretical framework and item content, labels were assigned to each extracted factor. Factor 1 primarily encompasses items related to students' lifestyle and their intentions regarding mobile device usage. These items reflect students' expectations regarding mobile device utilisation, the integration of mobile devices into daily life, and their learning processes. The highest loading item, item 5.18 (.852), "Using a mobile device is a necessity in today's world", signifies the essence of Factor 1, which can be labelled "Behavioural lifestyle intentions".

The item content of Factor 2 predominantly focuses on subjective social norms and has therefore been labelled that

way ("Subjective social norms"). An example is item 5.7 (.854), "I feel under social pressure to use it" (table 5). The content of these items refers to societal beliefs, together with feeling the pressure to comply with these norms when it comes to using mobile devices.

Factor 3 encompasses items related to students' opinions regarding the importance and expectations surrounding mobile device usage. The content of these items reflects students' attitudes toward mobile devices and their perceived significance. Among these items, item 5.2 (.811), "Using a mobile device is good", exhibited the highest factor loading. Therefore, the label "Attitude and expectations" is fitting for Factor 3. The exploratory factor analysis originally extracted four factors, but after the item content analysis and the consideration of theoretical constructs, Factor 4 consisted of a single item, "Whether or not I use it is entirely up to me" (item 5.12). Statistically, a factor must include at least two factors, which is why item 5.12 was excluded from any further analyses and, therefore, three factors were labelled and retained for further analysis. Table 3 lists the factors identified by the factor analysis, along with the labels that were assigned to them.

Table 3. Summary of factor labels

Factor	Label	Items	Cronbach's alpha (α)
Factor 1	Behavioural lifestyle intentions	5.18. 5.15. 5.16. 5.13. 5.19. 5.14. 5.9. 5.10. 5.17	.927
Factor 2	Subjective social norms	5.7. 5.8. 5.11	.502
Factor 3	Attitude and expectations	5.2. 5.4. 5.1. 5.5. 5.3. 5.6	.859

The factor loadings (table 5) were significantly robust to support construct validity. A reliable Cronbach's alpha coefficient confirms that the individual items of a construct measured the same construct or concept/s consistently. The validity of the construct, "Subjective social norms", is poor,

with a Cronbach's alpha value of .502. The construct, "Attitude and expectations", has a Cronbach's alpha value of .859, indicating good construct validity. The validity of the construct, "Behavioural lifestyle intentions", is excellent, with a Cronbach's alpha value of .927.

The three factors extracted and identified from the analysis offer a statistically delineated structure and a preliminary integrated framework for students' intended use of electronic mobile devices for study and learning purposes.

Use of mobile devices for study and learning purposes

Table 4 below illustrates the frequency of mobile device usage among participants and the purposes for which participants use the devices (question 6 from the survey). The respondents were asked to indicate how often they use mobile devices, with response options ranging from *never* (1) to *always* (5).

Table 4. Agreement levels regarding the use of mobile devices for studying and learning

Statement	Agreement level					Mean (M)
	Never(1)	—————>			Always(5)	
	n (%)	n (%)	n (%)	n (%)	n (%)	
6.1 A mobile device is used to study for online exams.	18 (2.8)	16 (2.4)	40 (6.1)	143 (21.9)	437 (66.8)	4.48
6.2 A mobile device is used to study for offline exams.	1 (7.8)	47 (7.2)	88 (13.5)	156 (23.9)	311 (47.6)	3.96
6.3 A mobile device is used to prepare for class lectures in advance.	38 (5.8)	52 (8)	116 (17.8)	156 (23.9)	290 (44.5)	3.93
6.4 A mobile device is used to submit assignments online.	9 (1.4)	5 (0.8)	8 (1.2)	53 (8.1)	577 (88.5)	4.82
6.5 A mobile device is used to communicate with my lecturers and other students.	15 (2.3)	33 (5)	64 (9.8)	93 (14.2)	449 (68.7)	4.42
6.6 A mobile device is used to watch video tutorials.	14 (2.1)	33 (5.1)	89 (13.7)	138 (21.2)	378 (58)	4.28
6.7 A mobile device is used to interact on social networks about academic matters.	41 (6.3)	68 (10.5)	110 (17)	124 (19.1)	305 (47.1)	3.90

Table 4 illustrates that the most common use of mobile devices for study and learning purposes is to "submit assignments online" (M = 4.82). A significant majority of the sample, 88.5% (n = 577), reported always using their mobile devices for this purpose. Despite this being the most prevalent use, the mean response (M) for the remaining statements regarding the frequency of mobile device usage for the listed tasks in question 6 was consistently above 3.5. This indicates frequent usage of mobile devices for study and learning purposes. The items can therefore be categorised as 'Use' with good

construct validity, supported by a Cronbach's alpha value of .820.

Investigation into the relationships between “Behavioural lifestyle intentions”, “Subjective social norms”, “Attitude and expectations”, and “Use of mobile devices for studying and learning”

A series of multiple linear regression (MLR) analyses was conducted, with “Use of mobile devices for studying and learning” as the dependent variable. The independent variables included “Behavioural lifestyle intentions”, “Subjective social norms”, and

“Attitude and Expectations”. The aim of the analyses was to ascertain whether significant statistical differences existed between the mean critical scores of “Behavioural lifestyle

intentions”, “Subjective social norms”, “Attitude and expectations”, and “Use of mobile devices for studying and learning” (refer to table 5).

Table 5. MLR results: Predicting the use of mobile devices for study and learning purposes

Predictor variable	b	SE	95% CI	t-ratio and p-value	β
Behavioural lifestyle intentions	.316	.058	[0.203; 0.429]	5.481; . <,001	.294
Subjective social norms	.088	.032	[0.024; 0.152]	2.713; .007	.096
Attitude and expectations	.205	.056	[0.094; 0.316]	2.713; . <,001	.198

Note: N = 654. Constant = 1.745, Model R² = 0.231, F_{3,812} = 66.307, p <0.05, b = unstandardised regression coefficient, β = standardised regression coefficient (beta weight)

The overall model explained the 23.1% variance in relationships, which was revealed to be statistically significant (F_{3,812} = 66.307, p <.001.). An inspection of individual predictors revealed that *Behavioural lifestyle intentions* (beta = .294; t = 5.481; p = <.001),

Subjective social norms (beta = .096; t = 2.713; p = .007) and *Attitude and expectations* (beta = .198, t = 3.641; p <.001) were significant predictors of the use of mobile devices for study and learning purposes (figure 1).

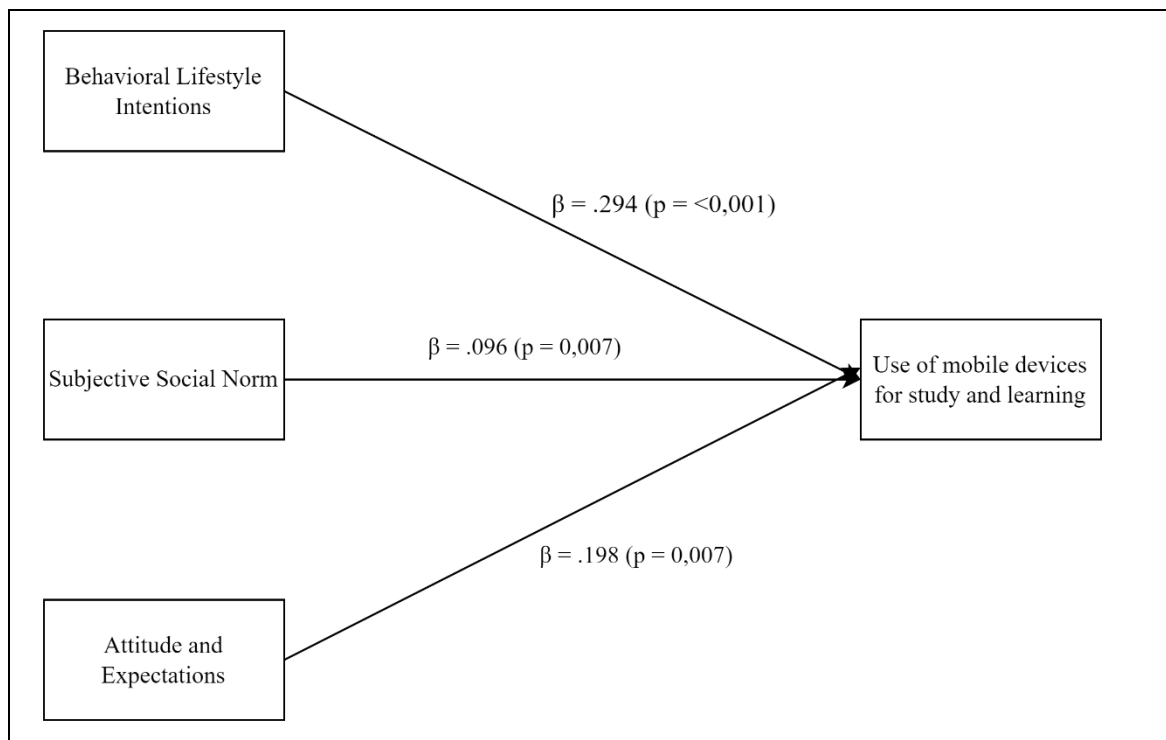


Figure 1. MLR results: Predicting the use of mobile devices for study and learning purposes

Discussion

The aim of the study was to explore students’ perspectives and opinions regarding mobile devices and their propensity to use

these devices for studying and learning. As regards students’ opinions on mobile devices, specifically in relation to learning and studying, more than two-thirds of the sample

strongly agreed that a mobile device is a necessity in today's world. This statement had the highest level of agreement among participants when compared with all the other opinions on mobile device usage in respect of studying and learning. The statement that had the highest level of disagreement was the following: "I feel under social pressure to use it." The overall opinion of students regarding mobile device usage, in a study and learning environment, was positive, where students believed it was beneficial, helpful, easy to use and important.

It can be deduced from the high level of agreement with the statements regarding use, for instance, "A mobile device is used to communicate with my lecturers and other students", "A mobile device is used to watch video tutorials" and "A mobile device is used to interact on social networks about academic matters", that the findings of this research confirm the findings of the research conducted by Pebriantika (2021) and Mortazavi et al. (2020), that is, students use mobile devices to enhance their learning experience and to complement the learning experience through the availability of additional study material. In addition, the findings of this research support the findings obtained by Gikas and Grant (2013) and Alshammari (2020), that is, students' propensity to use mobile devices is also linked to the extent to which mobile device use can be integrated with social media.

In exploring the perspectives and opinions of students regarding mobile devices, an exploratory factor analysis was conducted on the data. The analysis yielded four factors; however, following item content analysis and statistical assumptions, three factors were extracted and labelled 1) "Behavioural lifestyle intentions", 2) "Subjective social norms", and 3) "Attitude and expectations". These three factors provide a good basis for further model development with regard to students' use of mobile devices for study and learning purposes. The investigation into the

relationships between "Behavioural lifestyle intentions", "Subjective social norms" and "Attitude and expectations" in relation to "Use of mobile devices for studying and learning" revealed that the predictive effect that "Behavioural lifestyle intentions" and "Attitude and expectations" have on the use of mobile devices is stronger than that of "Subjective social norms", which is the perceived social pressure to use or not to use mobile devices for study and learning purposes. Therefore, it can be deduced that the use of mobile devices for study and learning purposes is more vested in individual students and their willingness to use mobile devices, rather than in social and institutional pressure.

CONCLUSION

Students' overall opinion on the use of mobile devices for learning and studying was optimistic and positive. Students' opinions regarding the use of mobile devices are based on three factors, namely, "Behavioural lifestyle intentions", "Subjective social norms", and "Attitude and expectations". All three factors affect the use of mobile devices; however, "Behavioural lifestyle intentions" and "Attitude and expectations" have the strongest effect. It can therefore be assumed that students have embraced the use of mobile devices for study and learning purposes. Institutions and academics need to harness and build on these insights. It is, therefore, recommended that institutions make mobile devices available to students, either as part of study material or through loan schemes or the provision of bridging finance.

The use of mobile devices will allow for the provision of interactive learning content (study material), as well as the use of simulations and gamification in teaching and learning. Exposure to real-life situations, through simulations and gamification, will enhance the learning experiences of students and contribute to their graduateness and

employability. It is recommended that academics adapt study material to be interactive, and that the use of simulations and gamification be investigated. In order to free academics from the administrative burden of attending to the adaptation of study material and other academic matters, it is recommended that institutions employ administrative and software specialists to assist academics.

A limitation of the study is that the survey was conveniently distributed to undergraduate students at a prominent South African institution of higher learning. Consequently, the findings may not be generalisable beyond the specific population. Future research on the topic should include a variety of public and private institutions of higher learning. In addition, future research should focus and expand on the learning uses of mobile devices and related activities. Future research should not only focus on students but also include faculty.

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