

1 A Model to Enhance Students Intention to Adopt and use Mobile 2 Learning in Ugandan Universities

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6

7 **Abstract**

8 M-learning systems have become the order of the day for universities in countries like Uganda
9 to conduct studies to their students. The main attention towards M-learning is the increase in
10 the number of mobile devices such as mobile phones, PDAs, Smart Phones, laptops, and iPads
11 as well as enhancements in the technological capabilities of these devices. The purpose of this
12 study was to develop a model to enhance students? intention to adopt and use mobile
13 learning. A number of factors have hindered the adoption and use of M-learning. Various
14 solutions have been put forward but they have not adequately addressed the issue of adoption
15 and use of M-learning in Ugandan Universities. In developing countries, M-learning adoption
16 and use is also constrained by lack of information about its requirements. The need therefore
17 remains, to determine requirements and customize existing M-learning adoption models to
18 suit the needs of universities in developing countries.

19

20 **Index terms**— m-learning, adoption and use, students? intention, m-learning systems.

21 **1 Introduction**

22 recent trend in Universities has been to seek out and integrate new tools into the educational process to facilitate
23 student learning ??MacCallum, 2011). Universities continually search for ways to support student learning that
24 is both engaging and effective. Technology has often been viewed as a way to provide both of these things to
25 the learner. The adoption of Mobile Learning technologies (M-learning) has fundamentally transformed a wide
26 range of educational, administrative and support tasks ??Dwumfuo, 2012).

27 According to MoES (2013), the government of Uganda is now encouraging alternative means of meeting
28 the demand particularly of higher education, one of these being M-Learning, especially in higher institutions
29 of learning. Subsequently Universities have tried to develop and implement M-Learning information systems
30 (Muyinda, 2013). Mobile applications and devices such as Smartphone's and tablets are changing the way that
31 Universities conduct learning activities to provide information, deliver services and engage with the students
32 (UCC, 2012). To keep up with the pace of change in technology, Universities need to adopt a strategic approach
33 that implements these new technologies and integrates them with existing service, information and communication
34 channels. (Kajumbula, 2006) Universities in Uganda have implemented Mlearning systems to support Distance
35 learners particularly Makerere University is running distance education (DE) degree programmes managed by
36 the Department of Distance Education to students scattered across Uganda ??Kajumbula, 2009). However,
37 ??uyinda (2011) and ??ajumbula (2009) reveal that Universities in Uganda that have implemented M-learning
38 such Makerere university, Kampala university among others have not registered the persistent and long term
39 usage of these M-Learning systems, an indicator that Mlearning systems have not been continuously adopted
40 and utilized by students. ??uyinda (2011) states that at Makerere University, only 85 users of M-learning system
41 were found to be active out of the thousand students. Similar scenario was reported by Kamugisha (2015) that
42 18 students were found to be active on the M-learning system installed at Kampala University. This low usage
43 of M-learning systems by students in these universities means that the adoption of such systems remains low yet
44 maximum benefits can be realized from the Mlearning system during and after its adoption (Chong et al., 2011).

6 INADEQUATE SECURITY, PRIVACY AND CONFIDENTIALITY:

45 Despite the wide acceptance of cell phones and mobile devices among university students, adoption of mobile
46 learning in universities, and academic libraries is still low and the determinants of acceptance are not clear.
47 M-learning adoption and usage has faced a number of challenges stated by different scholars, for example Ally
48 (2009) urges that student have unwillingness or disinterest in using mobile devices for academic purposes. Chikh
49 & Berkani (2010) states that students demonstrate a preference for traditional campus based education may
50 resist mobile learning out of fear. According to Lawrence, et al., ??2008) cites that students report the following
51 negative issues with mobile technology: limited storage, small screens, limited access to online reference material,
52 and slow downloading. ??ssegbe & Frempong (2011) asserts that usability barriers like small keyboards are
53 barriers to mobile learning. Lawrence, et al., ??2008) identify both the cost imposed by telecommunications for
54 access and mobile devices to be primary cost barriers for students.

55 Therefore, this study aimed at developing a model for M-learning adoption and use in Ugandan universities,
56 as an example of a developing country. A model defining dimensions of awareness and sensitization, user friendly
57 M-learning systems, enhanced security, privacy and confidentiality, tax reduction on Mobile Devices, effective
58 monitoring and evaluation, and M-learning usage policies and guidelines as pre-requisites that can enhance
59 student's intention to adopt and use M-learning in Uganda was developed. The model describes requirements that
60 are critical to successful adoption and use M-learning in Uganda. It therefore has potential to enhance students'
61 intention to adopt and use M-learning services in Ugandan universities and other developing countries with
62 similar contexts. The model is generic and can therefore be applied to other developing countries. Furthermore,
63 understanding of requirements for Mlearning adoption and use contributes to extending existing M-learning
64 adoption and use models.

65 2 II.

66 3 Literature Review a) M-Learning adoption Models

67 This section presents a review of existing Mlearning models with the aim of identifying the gap to be addressed
68 in the new framework.

69 4 b) Challenges to M-Learning adoption

70 Lack of acceptance to M-learning adoption: Donaldson (2011) states that the lack of acceptance to M-learning
71 adoption is due to a fear that it will reduce classroom interaction or cause miscommunication or confusion.
72 This has hampered the adoption of M-learning among students. Despite the wide acceptance of cell phones and
73 mobile devices among the teen and adults, faculty and support staff acceptance of mobile learning in universities,
74 and academic libraries is still low and the determinants of acceptance are not clear ??Lawrence, et al, 2008).
75 Ally (2009) urges that student have unwillingness or disinterest in using mobile devices for academic purposes.
76 Chikh & Berkani (2010) states that students demonstrate a preference for traditional campus based education
77 may resist mobile learning out of fear. This fear may stem from perception that mobile learning will reduce
78 classroom interaction or cause miscommunication or confusion due to inability to see facial, body, or voice cues
79 from instructors and peers. Complexity of use: Essegbe & Frempong (2011) asserts that it is complex to use
80 M-learning initiatives on Mobile devices. This may result from issues like small keyboards which may pose a
81 barrier to mobile learning. However, technology advancements in virtual keyboards may address this issue (Chikh
82 & Berkani, 2010) Small screen size can make viewing complex, cause eyestrain, or be difficult for vision impaired
83 individuals. In addition, web pages are not always designed for small screens (Donaldson, 2011). Small keyboards,
84 storage, and memory, and document editing capabilities may limit mobile academic activities ??Muyinda, 2011).

85 5 Cost:

86 The findings from the study carried out by Vosloo (2012) revealed that it's expensive to own and maintain mobile
87 devices for purposes of M-learning. Personal ownership of mobile devices (for example smart phones) and the
88 cost of unlimited Internet access are prohibitive for some students to fully adopt and use Mlearning as a tool
89 to improve on learning activities (Vosloo, 2012). Lawrence, et al., (2008) identify both the cost imposed by
90 telecommunications for access and mobile devices to be primary cost barriers for students.

91 6 Inadequate security, privacy and confidentiality:

92 According to Adedoja et al (??013), Mobile learning user information are meant to be confidential and secure,
93 however the education sector is constrained by genuine concerns about privacy, security and confidentiality of
94 education records of the students. This is consequently constraining the adoption and usage of M-learning in
95 Universities ??Muyinda, 2011). According to Lawrence, et al., 2008), for flawless sharing of students information
96 to be realized, the relevant stakeholders have to be committed to security of information of the students and they
97 have to assure students that their personal information will be secured and protected from unauthorized access.

98 7 Inadequate top management support on the use Mlearning 99 systems:

100 According to Crescente & Lee (2011), without the existence of a leadership and governance structures, it is
101 difficult to coordinate M-learning initiatives and align them with university priorities. This limits the necessary
102 leadership needed to engage students so as to promote M-learning initiatives. Chikh & Berkani (2010) stated that
103 insufficient top management support to adopt and use M-learning systems is a major challenge that is hindering
104 M-learning adoption and use among university students. Further, Ally (2009) urge that without good leadership
105 and governance from top management, then it can be difficult to provide for the necessary decision making rules
106 and procedures that give direction to, and oversee M-learning initiatives thus hindering M-learning adoption and
107 usage.

108 Access to desired information: Ngarambe (2013) states that access to information when and where an
109 information seeker desires is seen as a potential barrier for instructors. For instance, ready access to mobile
110 information during class may not be part of the instructor's agenda. Effective monitoring and evaluation of a
111 mobile initiative is necessary for successful implementation (Kutluk & Gülmез, 2013).

112 8 III.

113 9 Methodology a) Research Design

114 The study used Participatory Design approach mainly because it encouraged direct participation and active
115 involvement of users during the study. Participatory design approach called for involving potential users which
116 gave better insights that could not have been attained by not letting them participate. Descriptive statistics
117 involving mean and standard deviation were used to understand the level of respondent agreement with the
118 challenges and solutions to M-learning adoption and use. The purpose of this was find out if these challenges and
119 solutions can later be used as design requirement for M-learning adoption model to enhance students intention
120 to adopt and use M-learning systems. The study population from two selected universities comprised of 11,
121 363 students according to Muyinda (2013) ??009) supports this by stating that a researcher needs to get the
122 appropriate sample size in terms of accuracy and cost and that for any population above 10,000 but less than
123 15,000 the sample size is constant (370). However, of the 370 questionnaires administered 232 were obtained
124 giving us about 62.7% response rate. Purposive sampling was used to select the universities for carrying out the
125 study and simple random sampling was used to select the 370 respondents from the total population of 11, 363
126 students as a unit of analysis. Based on the chosen sample, questionnaires were distributed to the students who
127 are always involved and engaged in the use of M-learning services.

128 10 b) Data collection

129 The main data collection instrument that was used included the questionnaire, with other tools such as literature
130 review. Questionnaires contained structured series of questions and prompts relating to the study variables.
131 Questionnaires were used to collect primary data on challenges hindering M-learning adoption and use in Ugandan
132 universities and the possible solutions to these challenges. The data gathered from the questionnaire helped the
133 researcher in deriving the requirements that were used in developing the model to enhance student's intention
134 to adopt and use M-learning systems. The questions on the questionnaires were set up on an interval scale
135 with respondents answering in line with the extent to which they strongly agree, Agree, Not Sure, Disagree,
136 strongly disagree. Briefly and to the point, questions were designed addressing only a single variable at a time
137 and avoiding expressions that could bring out unacceptable responses. Each challenge and solution was measured
138 by at least five questions that were relevant. in terms of prior research ambiguous and vague question were either
139 improved or deleted. Following the guidelines by Carcary (2008), the questionnaire contained a heading clearly
140 informing respondents that results would be completely anonymous as means of seeking for honesty and avoiding
141 exaggeration while.

142 IV.

143 11 Results

144 12 a) Descriptive statistics for challenges and solutions to M- 145 learning adoption and usage

146 In order to understand the challenges to Mlearning adoption and the possible solutions, descriptive statistics
147 involving mean and standard deviation were used to understand the level of respondent agreement with the
148 challenges to M-learning adoption and use and the proposed solutions. The purpose of this was to blend these
149 challenges and solutions later as design requirement for enhancing students intention to adopt and use M-learning
150 systems as seen in tables 2, 3 and 4 as seen below; From Table 3 above, the finding of the study revealed that the
151 respondents agreed with the above suggested solutions to the challenges to M-learning adoption and usage. Most
152 overriding solutions to the challenges to M-learning adoption and usage are; effective monitoring and evaluation
153 of a mobile learning course content (Mean=4.458, SD=.732), followed by There should be policies and guidelines

15 C) MODEL DEVELOPMENT

154 in place to support effective and continuous use of M-learning systems (Mean=4.435, SD= .693), followed by
155 Enhance security, privacy and confidentiality of the Mlearning systems (Mean= 4.377, SD=.741), Providing tax
156 reductions to enhance increased possessions on Mobile devices (Mean=4.339, SD=.741), Create more awareness
157 and sensitizations on the benefits of Mlearning systems to student (Mean= 4.246, SD= . 875) and finally Develop
158 user friendly M-learning systems suitable for student needs (Mean= 4.217, SD=.879). These finding means that
159 the above solutions should be considered by universities if they are to enhance student's intention to adopt and
160 use M-learning systems to enable learners attain their learning goals. These challenges and solutions can now be
161 derived as design requirements for enhancing student's intentions to adopt and use M-learning system.

162 13 b) Discussion of the requirements for developing a model

163 The requirements for enhancing student's intention to adopt and use M-learning systems system in Ugandan
164 universities are here then discussed based on the results in table 2 and 3. This was done in order to derive
165 requirements from the solutions to the challenges to M-learning systems adoption and usage and there after use
166 those as requirements for design specification for the Model to enhance student's intention to adopt and use
167 M-learning in Ugandan universities. Therefore, the requirements for developing a model for enhancing students
168 intention to adopt and use M-learning in Ugandan universities as presented in table 4 with codes CM1 to CM6
169 represent the challenges to M-learning adoption and usage while codes R1 to R6 representing the requirements
170 which are also derived as solutions to the challenges. Lack of acceptance to M-learning adoption (CM1): This
171 challenge hinders the adoption and usage of M-learning systems. The result in table 2 revealed that most students
172 lack acceptance to M-learning system and this was hindering the adoption and usage of M-learning systems. This
173 is in line with Donaldson (2011) who stated that lack of acceptance to M-learning adoption due to fear that will
174 reduce classroom interaction or cause miscommunication or confusion has hampered the adoption of M-learning
175 among students.

176 It is complex to use M-learning systems on Mobile devices (CM2): This challenge hinders the adoption and
177 usage of M-learning systems. The result in table 2 revealed that most respondents find M-learning systems
178 as complex to use and this was hindering the adoption and usage of M-learning systems. This is in line with
179 Essegbe & Frempong (2011) who asserted that it is complex to use M-learning initiatives on Mobile devices.
180 This may result from issues like small keyboards which may pose a barrier to mobile learning. Donaldson (2011)
181 relates this challenge to small screen size which makes viewing complex, cause eyestrain, or be difficult for vision
182 impaired individuals.

183 14 Inadequate security, privacy and confidentiality of M-

184 learning System (CM3): This challenge hinders the adoption and usage of M-learning systems due to fear that
185 student's information may be exposed to non authorized individuals. This is in line with Adedoja et al (2013) who
186 asserted that the education sector is constrained by genuine concerns about privacy, security and confidentiality
187 of education records of the students. This challenge is also in line with ??uyinda (2011) who stated that security
188 concerns are consequently constraining the adoption and usage of M-learning in Universities.

189 Expensive to own and maintain mobile devices for purposes of M-learning (CM4): The result in table 2
190 revealed that costs to acquire and maintain mobile devices for purposes of learning are high. This was hindering
191 the adoption and usage of M-learning systems. This challenge undermines the abilities of the students to adopt
192 and use M-learning for academic purposes. This is in line with Vosloo (2012) who stated that it's expensive to
193 own and maintain mobile devices for purposes of Mobile learning.

194 Inadequate top management support on the use Mlearning systems (CM5): This challenge hinders the users of
195 M-learning system from knowing what they supposed to do with the system when and where (Chikh & Berkani,
196 2010). The findings in table 2 revealed that there is Inadequate top management support on the use M-learning
197 systems. This is in line with the finding from Crescente & Lee (2011) who stated that Inadequate top management
198 support on the use M-learning systems constrains the adoption and usage of M-learning.

199 Crescente & Lee (2011) further states that without the existence of a leadership and governance structures
200 to guide the use of M-learning, it is difficult to coordinate M-learning initiatives and align them with university
201 priorities. This limits the necessary leadership needed to engage students so as to promote M-learning initiatives.

202 Access to desired information by the students is a potential barrier to adopt M-learning (CM6): This challenge
203 affects student's ability to efficiently use Mlearning system. The result in table 2 revealed access to desired
204 information by students is a potential barrier and this was hindering the adoption and usage of M-learning
205 systems. This is in line Ngarambe (2013) who stated that access to information when and where an information
206 seeker desires is seen as a potential barrier for instructors. For instance, ready access to mobile information
207 during class may not be part of the instructor's agenda which ends up affecting students need to access the
208 desired information any time anywhere.

209 15 c) Model Development

210 The model development Process was done with the aim of identifying the factors that are necessary for designing
211 "MESIAUM" a model for enhancing student's intention to adopt and use M-learning In Ugandan Universities.
212 This section presents the design of the model for adoption and use of mobile learning in Uganda. The Model was

213 developed with stakeholders being identified and their roles outlined. The following stakeholders were identified
214 so as to enable the researcher to develop the model;

215 The table 5 shows the role played by different actors in the process of designing Model to enhance student's
216 intention to adopt and use M-learning: The below shows the variables that were extracted from the respondents'
217 feedback. The derived variables were extracted from the challenges that were presented on the questionnaires
218 (Table table 2 and table 3) This implies that awareness and sensitizations, user friendly M-learning systems,
219 Enhanced security, privacy and confidentiality, tax reductions, policies and guidelines effective monitoring and
220 evaluation should were highly considered in development of a model to enhance students intention to adopt and
221 use M-learning in Ugandan Universities. ii. Variables from the Literature Review In order to align the adoption
222 and usage model to existing models, variables from existing models were also considered. These variables were
223 also considered appropriate in the factor analysis. These variables were subjected to factor analysis to be able to
224 identify the most important factors that influence the adoption and usage of M-learning initiatives in Ugandan
225 universities.

226 **16 d) The Model to enhance student's intention to adopt and 227 use M-learning in Ugandan Universities**

228 The Model to enhance student's intention to adopt and use M-learning was developed to incorporate the factors
229 that influence M-learning adoption and usage from both the constructs identified in tables 6, 6.1 and 6.2 Further
230 the model also put into consideration the stakeholders and the roles they play in ensuring that mobile learning
231 systems can be adopted and used in Uganda.

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234 The Figure ?? illustrates the developed model

235 **18 V. Contributions of the Model to M-Learning Adoption and 236 use**

237 While the outlined model in Figure ?? extends an existing one as described by Mtebe and Raisamo (2014),
238 it also makes a contribution by presenting new features useful for adoption and use of M-learning systems in
239 the context of Ugandan universities as a developing country. The model provides for new dimensions required
240 for the M-learning adoption and use process mentioned and discussed here under the themes of awareness and
241 sensitization, user friendly Mlearning systems, enhanced security, privacy and confidentiality, tax reduction on
242 Mobile Devices, effective monitoring and evaluation, and M-learning usage policies and guidelines.

243 **19 a) User friendly M-learning systems**

244 The primary challenge to M-learning adoption and use in Ugandan universities is complexity to use Mlearning
245 initiatives. The need therefore remains for the university management to endeavor and ensure that user friendly
246 M-learning systems suitable for student needs are designed to enable both learners and educators achieve their
247 intended goals. The systems should not be complex to use because a complex system hinders efficient usage of a
248 technology. Technologically, a user friendly system increases the end users ease of use of mobile learning systems.
249 This is because complex mobile learning systems hinder students from using such services; if students find the
250 systems can easily support self management of learning then it is perceived to be useful. Hence this can help

251 **20 b) Awareness and Sensitization**

252 Lack of acceptance to M-learning adoption due to a fear that it will reduce classroom interaction or cause
253 miscommunication or confusion is recognized as one of the main challenges for M-learning adoption and use in
254 developing countries like Uganda. Following successful user friendly M-learning systems, There is need for the
255 university management to train, create more awareness and sensitize their students on how to Use M-learning
256 systems and what are the likely benefits of adopting and using M-learning systems for academic purposes and
257 this will go a long way in enhancing students intention to adopt and use M-learning systems. Hence this can
258 help in solving the lack of acceptance to M-learning adoption due to fear that will reduce classroom interaction
259 or cause miscommunication or confusion.

260 **21 c) M-learning usage policies and guidelines**

261 Setting up usage policies and guidelines are important as prerequisites for enhanced student's intention to adopt
262 and use M-learning systems in universities in a developing country like Uganda. It is therefore important for
263 universities to set policies and guidelines in place to support effective and continuous use of M-learning systems as
264 one of the solutions to enhance adoption and use of M-learning systems in Ugandan universities. This is because,
265 good leadership and governance from top management, provides for the necessary decision-making rules as well
266 as procedures that give direction to, and on the use of M-learning. Good policies and guidelines build trust and

267 confidence among the different education service, spells out roles and usage of system clearly, the functionality
268 that must be met by the system among others. The policies have to also be reviewed on a regular basis to make
269 sure that they remain aligned with the adoption and use of Mlearning systems objectives of the universities.
270 Hence this will help address the challenge of Inadequate top management support on the use M-learning systems.

271 **22 d) Effective monitoring and evaluation**

272 There is a need for Lecturers at the universities to routinely upload M-learning contents or materials that promote
273 learning and create knowledge among the learners to ensure that there is mobility of learning any were any time.
274 Availability of contents on M-learning systems makes students derive a sense out of the Mlearning. Hence this
275 would help address a challenge of Access to desired information by the students as a potential barrier to adopt
276 M-learning.

277 **23 e) Tax reduction on Mobile Devices**

278 The Universities in collaboration through the Ministry of Education, sports and ICT, should request the
279 government of Uganda to provide tax reductions on mobile smart devices for of academic purposes to increase
280 on the possessions of smart mobile devices to ensure that university students can posses' mobile devices that can
281 be used to carry out academic tasks and to promote learning activities.

282 **24 f) Enhance security, privacy and confidentiality**

283 Inadequate security, privacy and confidentiality hold back M-learning adoption and use in Ugandan universities.
284 The need therefore remains to provide adequate security, privacy and confidentiality in the Mlearning systems
285 used by students. Security and privacy measures should be considered in the design of Mlearning systems. This
286 is because security and privacy measures ensure confidentiality, integrity and availability of students' information
287 as it is being exchanged across different M-learning modules. Authentication techniques such as password,
288 fingerprints, retina scans and biometric devices such as finger print readers and voice scanning systems can be
289 used to help ensure data security.

290 To enhance security, privacy and confidentiality, it requires establishing the appropriate security and privacy
291 measures and therefore, implies the need for the following steps:

292 -Identify the potential security threats -Identify the available security measures -Assess the strength and
293 weakness of each security measure -Determine the most appropriate security measure to use.

294 VI.

295 **25 Conclusion**

296 The existing M-learning adoption models have been of little use in enhancing the adoption and usage of M-learning
297 systems in Ugandan universities for a case of Uganda as a developing country. This is largely because the models
298 were developed based on requirements of the universities in developed country environments. Therefore, the
299 requirements and motivation toward M-learning adoption is essentially different in developing countries due
300 to these fundamental differences in the challenges that deter efficient adoption and usage of M-learning. For
301 universities in a developing country like Uganda, The need remains for tailored M-learning models that will
302 significantly enhance the adoption and use of Mlearning. This requires identifying the major challenges that
303 obstruct students from adopting M-learning initiatives, blend the identified challenges into viable requirements
304 and incorporate them into the existing models that were designed based on the conditions in developed countries.

305 This study therefore identified requirements critical to an enhanced adoption and use of M-learning systems
306 in universities in Uganda as a developing country. The model that was developed incorporates activities required
307 for enhanced adoption and use of Mlearning systems. These requirements include I) awareness and sensitization,
308 II) user friendly M-learning The model is generic and can be applied in other universities in developing countries
309 with similar contexts.©

310 Furthermore, the understanding of requirements and development of a model for Mlearning systems contributed
311 to the extension of existing knowledge on M-learning adoption and usage models.

312 VII. ¹

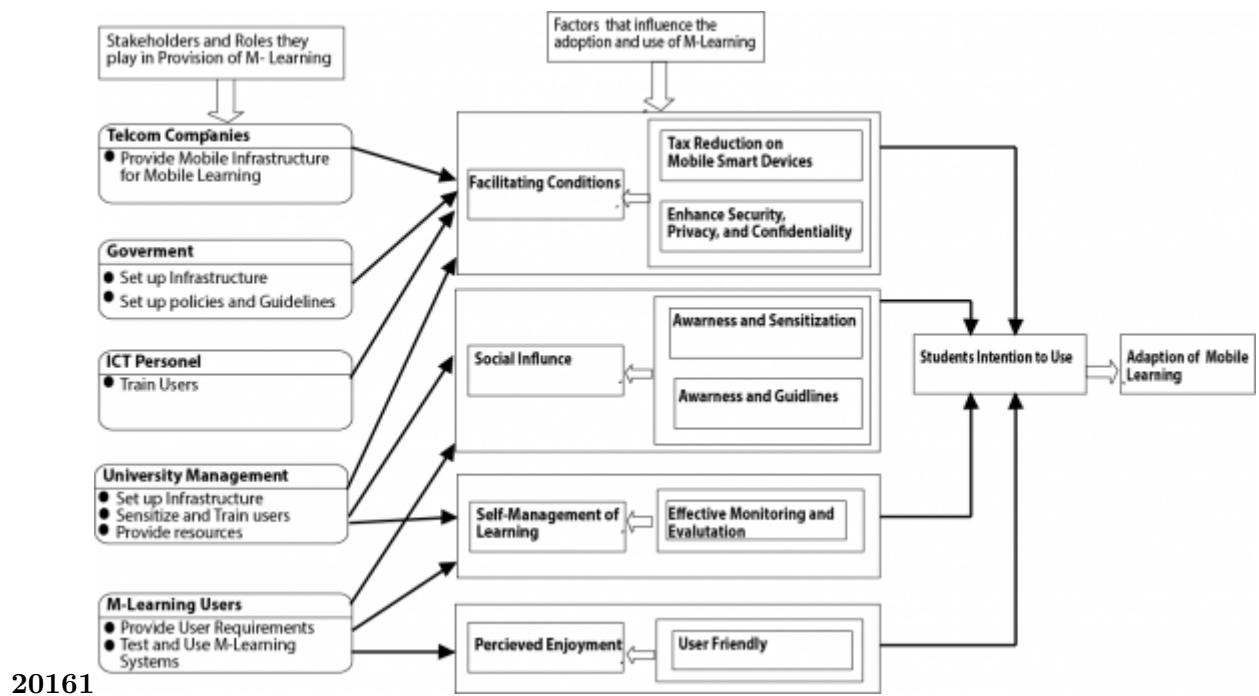


Figure 1:) 2016 GFigure 1 :

A Model to Enhance Students Intention to Adopt and use Mobile Learning in Ugandan Universities

model to predict students' behavioral intention to adopt and use mobile learning.

iii. A model for Students' Acceptance of M-Learning in Universities

A model was developed by Abu-Al-Aish & Love

i. A Model for Mobile Learning Adoption: Lu and Viehland (2008) developed a model for enhancing mobile learning adoption among University students in New Zealand. This model was developed with the expectation that mobile learning will enhance their learning activities if universities provide facilities for mobile learning. Lu and Viehland (2008) considered six key factors that influence the behavioral intention of users to adopt mobile learning; they are perceived usefulness of mobile learning, perceived ease of use of mobile learning, attitude toward using mobile learning, subjective norm, self-efficacy and perceived financial resources. The framework largely helped to improve Education delivery by use of mobile devices that enabled anywhere / anytime learning that allowed students to more closely integrate learning activities into their busy lives. Lu and Viehland (2008) M-Learning model was based on Attwell's M-learning model (Attwell, 2005). (2013) for Students' Acceptance of M Learning in Brunel University. Abu-Al-Aish & Love (2013) states that the model was developed with a view of stirring M-learning to play an increasingly significant role in the development of teaching and learning methods for universities basing on the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). Abu-Al-Aish & Love (2013) developed a model to identify the factors that influence the acceptance of m-learning in Universities and to investigate if prior experience of mobile devices affects the acceptance of M-learning. Cohen (2010) Further, Lu and Viehland (2008) ignored the variable of Students self-management of Learning in enhancing adoption and use of M-Learning by University students. Students can promote acceptance of m-learning by adding value to their traditional learning methods using m-learning. This is because Self-management of Learning comes as a result of developing competence and skill in learning how to learn.

ii. A model to investigate student's behavioral intention to adopt and use mobile learning: Mtebe and Learning in order to predict behavioral intention to adopt and use mobile learning in a given context. Some of the factors which can be considered are perceived Raisamo (2014) developed a model to investigate student's behavioral intention to adopt and use mobile learning in higher education in East Africa. The model was developed to widen access, increase flexibility and mobility to access learning resources in Universities of East Africa. Mtebe and Raisamo (2014) model was based on the original UTAUT model of Venkatesh et al. (2003) which was adopted and extended to examine students' behavioral intention to adopt and use mobile learning. The four constructs in the UTAUT model investigate student's intention to adopt and use constructs included Performance expectancy, Effort expectancy, Social influence, Facilitating conditions. According to Prajapati & Jayesh (2014), the mobile Learning model was successfully applied in a few universities in Kenya and Tanzania which helped those who were involved in planning and developing mobile learning for higher education in East Africa to make mobile learning services relevant and acceptable to learners in their universities. However, a critical look at Mtebe and Raisamo (2014) model for mobile learning adoption by Prajapati & Jayesh (2014) shows that Mtebe and Raisamo ignored and did not investigate the effect of Gender, Age or Experience in behavioral intention to use mobile learning were the majority of students in universities are not of the same age and have variations in technological experiences. Further, Mtebe and Raisamo (2014) did not consider adding new factors in the model for M-Mobile Learning (Mtebe and Raisamo, 2014). The

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Figure 3:

2

Items (N=232)	Mean	SD
There is lack of acceptance to M-learning adoption due to fear that will reduce classroom interaction or cause		
It is complex to use M-learning systems on Mobile devices	4.5883	
	.69787	
There is Inadequate security, privacy and confidentiality of M-learning System	4.4435	
	.65394	
It's Expensive to own and maintain a mobile devices for purposes of M-learning	4.4934	
	.78857	
Inadequate top management support on the use M-learning systems	4.3680	
	.66748	
Access to desired information by the students is a potential barrier to adopt M-learning	4.4787	
	.68470	
Source:		
Primary		
Data		

Figure 4: Table 2 :

3

Item (N=232)	Mean	SD
Create more awareness and sensitizations on the benefits of M-learning systems to student	4.2462	
	.87482	
Develop user friendly M-learning systems suitable for student needs	4.2168	
	.87911	
Enhance security, privacy and confidentiality of the M-learning systems	4.3766	
	.74070	
Providing tax reductions to enhance increased possessions on Mobile devices	4.3386	
	.73059	
There should be policies and guidelines in place to support effective and continuous use of M-learning system		
There should be effective monitoring and evaluation of a mobile learning course content	4.4583	
	.73170	
Source: Primary Data		

Figure 5: Table 3 :

Code General challenges to M-learning adoption and usage CM1 There is lack of acceptance to M-learning a

CM5	Inadequate top management support on the use M-learning systems
CM6	Access to desired information by the students is a potential barrier to adopt M-learning

[Note: 2016GSource: Primary Data]

Figure 6: Table 4 :

5

Stake Holder	Roles
Telecommunications Companies	Telecom companies include MTN, UTL, Airtel and Orange. They help to set-up mobile network infrastructure for mobile learning systems to operate on.
Mobile-learning users	Provide user requirements, test and use the designed Model
University Top Management	Setup the infrastructure, Identify stakeholders, Carry out evaluation, organize and train users, sensitize users , provide economic resources and bench mark M-learning system models elsewhere
Government	Set up the infrastructure through Ministries and bodies such as Ministry of ICT, NITAU

Figure 7: Table 5 :

6

Code Requirements/solutions	Derived variables
R1 Create more awareness and sensitizations on the benefits of M-learning systems to student	DV1 Awareness and Sensitization
R2 Develop user friendly M-learning systems suitable for student needs	DV2 User friendly M-learning systems
R3 Enhance security, privacy and confidentiality of the M-learning systems	DV3 Enhance security, privacy and confidentiality
R4 Providing tax reductions to enhance increased possessions on Mobile devices	DV4 Tax reduction on Mobile Devices
R5 There should be policies and guidelines in place to support effective and continuous use of M-learning systems	DV5 Provide M-learning usage policies and guidelines
R6 There should be effective monitoring and evaluation of a mobile learning course content	DV6 Effective monitoring and evaluation

Figure 8: Table 6 :

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Model	Variable	Source
UTAUT	Social Influence	Venkatesh et al.'s (2003)
UTAUT	Facilitating Conditions	Venkatesh et al.'s (2003)
UTAUT	Students Intention to use	Mtebe and Raisamo (2014)
UTAUT	Adoption	Venkatesh et al.'s (2003)

Figure 9: Table 6 . 1 :

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Title	Variable	Author
Factors that influence student's intention to adopt and use M-learning	Self-management of Learning	Huang (2014)
Factors that influence student's intention to adopt and use M-learning	Perceived learning	Wang and Li (2012)
	Enjoyment	

Figure 10: Table 6 . 2 :

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