Evaluating Heutagogical ICT User Personality Characteristics for Girls Learning in Universities

Dr. Alice Wechuli Nambiro and Dr. Anselemo Peters Ikoha

Department of Information Technology, Kibabii University, Kenya

Abstract

Digital technologies pervasiveness is changing the way people access information and understand it to gain knowledge and interact with what is around them and their relationship with other people. The adoption of Technology- Enabled Learning in institutions of higher learning seemed to provide a gender neutral learning since boys and girls can access the learning from anywhere and anytime. However, the access and use of the technology proves to be different. It is perceived that boys are more open-minded in the use of technology than girls. This suggests the decrease of girls in the use ICTs. Institutions of higher learning adopted blended or fully online mode of learning since the Covid-19 pandemic. This led to some form of stress among students especially those who were used to the face to face mode of learning. The stress seemed to be more evident in girls than in boys. When it comes to openness to the use of technology in learning, boys are more curious and accept the challenge more easily than girls. Uptake of ICT among girls is low due to user personality characteristics. This paper proposes a new model of ensuring that girls are fully involved in using ICT in learning despite their personality characteristics.

Keywords

ICT, Heutagogy, Evaluation, Lifelong Learning, Gender, User Characteristics

1. Introduction

Information and Communication Technology (ICT) is increasingly being adopted by institutions of higher learning across the globe with the intention of enhancing teaching and learning. By definition, (ICTs) are technologies that allow for sharing of information and communication with other people over the internet (Sosa & Manzuoli, 2019). It provides very vital tools and a great opportunity to deal with cost, time, distance and knowledge dissemination limitations among others. The use of technology enhances the way information is accessed, diffused and used. Heutagogy is the study of self-determined learning (Thakur, 2017). Students in a heutagogical approach are self-determined and highly autonomous. The emphasis is placed on development of learner competencies, capacity and capability to learn. With the existence of augmented reality and virtual reality in education, the role of the educator which was instructor-based has changed to facilitator oriented. This has enabled students to be lifelong learners by making them capable and competent by exhibiting creativity, self-efficacy and ability to collaborate with others. This however was noted to be hindered by students' ICT user personal characteristics. This is the reason why this research was carried out to develop a model that cabs the digital divide in education.

2. Literature Review

2.1. ICT User Personality Characteristics

Despite the affordability and access to ICT by both men and women, there still exist a gender gap in its adoption and usage. This is revealed in the low ICT access and usage by women as compared to men due to psychological, structural, socio-economic, and institutional barriers (Singh, Singh & Kumar, 2019).

A research by GSM Association (GSMA) showed that there exist a gender gap in adoption of mobile internet in some urban areas in Asia, Africa and Latin America (Rowntree, 2018). The study indicates that more than half of the inhabitants can afford mobile phone and mobile internet services though there exist people (both men and women) who neither adopt mobile phone nor mobile internet services. According to a report by International Telecommunications Union, 2017, more men adopt ICT globally than women. The report further state that the proportion of women using the Internet is 12% lower than the proportion of men using the Internet worldwide.

2.2 Girls Perception towards Use of ICT

ICT is one of the most promising developments of recent times that have immense potential in addressing many gaps in human socio-economic development (Ojokoh et al, 2013). However, harnessing the potential brought by ICT requires thoughtful planning due to the challenge that comes with it.

Researches have been globally undertaken to gauge women participation in ICT. One of the researches focused on empowerment of women and ICT (Ojokoh, 2010). Another research of importance focused on the investigation on the ICT availability, accessibility and use by women academics (Olatokun, 2007). It was noted from the findings in the studies that the level of women participation in ICT activities is lower than that of men.

According to Ancheta-Arrabal, 2021, the reasons for the digital gender gap are harmful social norms and inequitable access to education that exist in the world. This therefore negatively impacts girls' digital adoption and use in education which is often limited by the lower levels of digital literacy and a lack of confidence.

According to Kuroda, 2019, the main barriers to girl's digital access and use are first, the availability of relevant infrastructure which includes the device, electricity and Internet, then the cost and affordability which takes into account the cost of owning the device and the cost of usage. Third, usability and skills which takes into account the digital literacy level and confidence in usage. Finally, safety and security.

2.3 Existing Evaluation Models

This section presents models related to the study.

Author	**Model**	**Function**
Thakur, 2017	Heutagogical Learning Efficiency Model	Integration ICT in the Classroom based on his pedagogical experience The model has five components • Gaining information where the educator provides relevant resources via a platform which students are comfortable with • Processing of information where the student will go through the content from the sources provided by the educator and structures the information through systematic inquiry • Organization and structuring of information where the students using software have the opportunity to create maps which are special concepts representation ad their interrelationships whose intention is to represent knowledge structures stored in the minds of human beings • Share, discuss and collaborate where using relevant platforms like video conferencing, chats of discussion forums depending on the need, the students share knowledge and create networks and reflect on their learning process. • Application and creation where students create text, audio, video or multimedia material as per their need **Gap** It can be noted that this model majorly focused on online learning with an assumption that all students are able to efficiently and comfortably use technology in their learning. It did not also consider the user characteristics of students of different gender.
Marie & Hase, 2015	Heutagogy: A Holistic Framework for Creating Twenty-First-Century Self-determined Learners	This framework based on heutagogic design elements and how they can be supported using technology. The elements are:

		• Explore which dictates that learners need to be given opportunity and freedom to explore a variety of knowledge sources among them the digital library. • Create which provides that the learner needs to be given freedom to create. Learners can use a variety of online tools to create mind maps. • Collaborate which provides an environment where learners can learn from each other. • Connect where there is networking with others in order to share knowledge. • Share where after connecting with fellow learners, knowledge can be shared. • Reflect where previous learning is consolidated and new learning occurs. **Gap** It did not specifically consider the user personality characteristics of girls in learning.

3. Methodology

Case study research design was adopted where a case of Kibabii University, Kenya was used. Case study is a research method which is used to answer how and why questions regarding an issue to be investigated, with no researcher control over variables and when the case is current (Ozan et al. 2017). Case study is relevant to this study because it allows the description of many factors and their relationship in real contexts. Case study is useful in putting theories into practice. Data relating to girls use of ICT in education was collected. Data was collected using questionnaires and analysis was both descriptive and inferential in nature.

4. Findings and Discussion

100 questionnaires were sent out to the target respondents who are girls in undergraduate programmes I Kibabii University drawn from different programmes. Out of the delivered questionnaires, 80 questionnaires were fully filled and returned representing 80% response rate. The finding from the questionnaires are presented in the sections that follow.

4.1 Age of the Respondents

This question sort to determine the age distribution of the respondents. The results indicate that 16.3% of the respondents were below 20 years of age, 81.3% of the respondents were from 20 to 29 years of age while 2.5% were from 30 to 39 years of age.

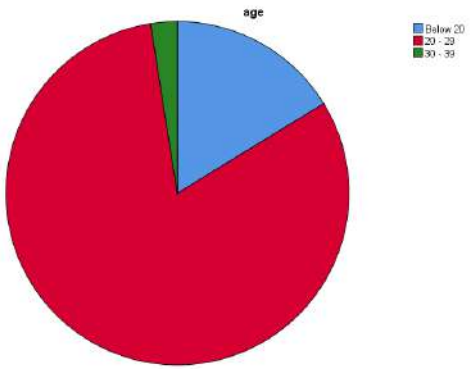

Figure 1: Age

4.2 Programme category

This question sort to collect data from students taking computer related courses and those that do not within the university. The aim was to find out if experts in using computing devices had an upper hand over the rest. Results indicate that 52.5% of the respondents are in computing programmes while 47.5% are in other courses which include criminology, phycology among others.

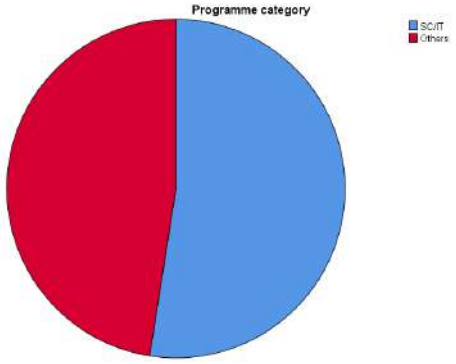

Figure 2: Study Programme

4.3 Year of study

This question sort to find out the level of study of the respondents. Results indicate that 35% of the respondents were in their second year of study, 32.5% were in their third year of study while 32.5% were in their final year of study. The data represented all levels of study.

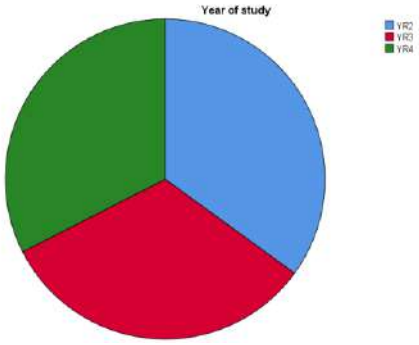

Figure 3: Level of study

4.4 Marital status

The question sort to find out the marital status of the respondents. Results indicate that 92.5% of the respondents were single while 7.5% of the respondents were married.

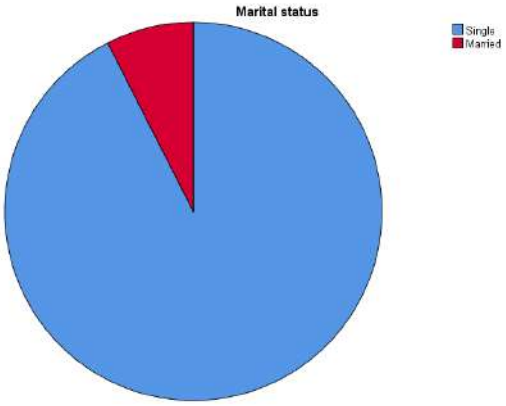

Figure 4: Marital Status

4.5 Employment status

The question sort to establish the employment status of the respondents. Results indicate that 3.8% of the respondents were employed while 96.2% of the respondents were not employed.

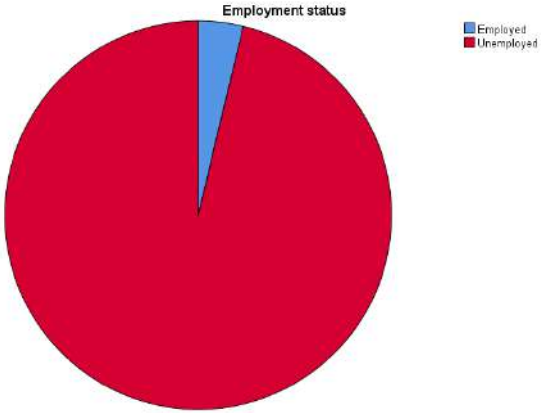

Figure 5: Status of employment

4.6 Place for conducting learning activities

The question sort to establish where the respondents mostly conduct their learning activities. This is because comparatively urban areas have well established infrastructure (electricity, internet) compared to rural areas. Results indicate that 22.5% of the respondents do so in rural areas, 35% mostly conduct learning in urban areas while 37.5% conduct their learning in semi-urban places.

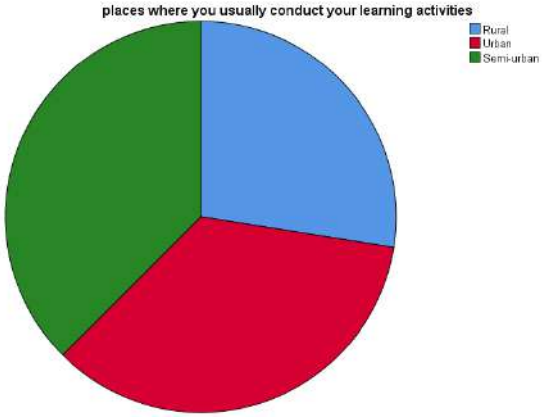

Figure 6: Place of Learning

4.7 Learning Environment

The question sort to find out the kind of learning environment that the respondents are mostly exposed to. Results indicate that 50% of the respondents indicated that the environment is always quiet, 45% of the respondents indicated that the environment is sometimes noisy while 5% of the respondents indicated that they learn from an environment that is always noisy.

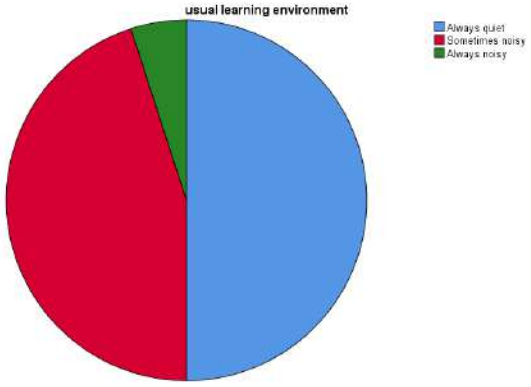

Figure 7: Learning Environment

4.8 Computer Knowledge and the use

The question sort to establish the respondents' competence level in the use of ICTs. This was because knowledge in use of ICTs is a prerequisite for using them in learning. Results indicate that 23.8% of the respondents were excellent in the use of ICTs, 38.8% of the respondents rated their skills as very good, 23.8% of the respondents rated their knowledge in use of ICTs as fair while 13.8% of the respondents admitted that their knowledge in use of ICTs was basic. This indicates that all respondents had some knowledge in use of ICTs thus can participate well in earning using ICTs.

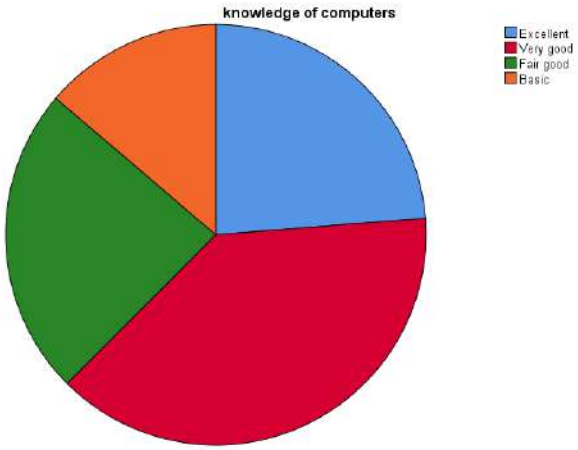

Figure 8: ICT Knowledge

4.9 Frequency of Use of ICT

The question sort to establish the respondents' frequency of use of the heutagogical ICT devices and applications. The response were put on a scale of 1 to 6 where 1 indicated that the respondent never uses the ICT or application, 2 indicated that the respondent uses the ICT in an irregular manner, 3 indicated that thay use once a week, 4 indicated that they use 2-3 times a week, 5 indicated that they use 4 times a week while 6 indicated that they use the ICT more than 5 times a week. Results indicate that 13.8% of the respondents do not have a specific frequency in which they access Internet thus irregular, 10% of the respondents use Internet once a week, 8.8% of the respondents use Internet 2 to 3 times a week, 17.5% of the respondents use Internet 4 times a week while 50% of the respondents use Internet more than 5 times a week. This indicate that majority of the respondents use mobile phones many times a week thus Internet access is good thus support online learning. 15% of the respondents do not have a specific frequency in which they use mobile phones thus irregular, 20% of the respondents use mobile phones 2 to 3 times a week, 17.5% of the respondents use mobile phones 4 times a week while 47.5% of the respondents use mobile phones than 5 times a week. Mobile phones support learning thus an indication of infrastructure availability. Data indicates that 15% of the respondents do not have a specific frequency in which they access email thus irregular, 16.3% of the respondents access email once a week, 22.5% of the respondents access email 2 to 3 times a week, 15% of the respondents access email 4 times a week while 31.3% of the respondents access email more than 5 times a week. Email is one way in which online learning can be achieved. Majority of the respondents can access content when posted. Learning Management Systems is a powerful tool that supports asynchronous online learning. Results indicate that 8.8% of the respondents do not have a specific frequency in which they use learning management system thus irregular, 16.3% of the respondents use learning management system once a week, 16.3% of the respondents use learning management system 2 to 3 times a week, 18.8% of the respondents use learning management system 4 times a week while 40% of the respondents use learning management system more than 5 times a week. This indicates that majority of the respondents participate in self-directed online learning. 10% of the respondents do not have a specific frequency in which they use computer applications thus irregular, 18.8% of the respondents use computer applications once a week, 12.5% of the respondents use computer applications 2 to 3 times a week, 25% of the respondents use computer applications 4 times a week while 33.8% of the respondents use computer applications more than 5 times a week. Computer applications assist in creation of content. Since students are encouraged to be content creators, majority of them support the idea.

Table 1: Heutagogical ICTs

ICT	Irregular	Once a week	2-3 times a week	4 times a week	> 5 times A week
Internet	11 (13.8%)	8 (10%)	7 (8.8%)	14 (17.5%)	40 (50%)
Mobile Phone	12 (15%)	0 (0.0%)	16 (20%)	14 (17.5%)	38 (47.5%)
E-Mail	12 (15%)	13 (16.3%)	18 (22.5%)	12 (15%)	25 (31.3%)
Learning Management System	7 (8.8%)	13 (16.3%)	13 (16.3%)	15 (18.8%)	32 (40%)
Computer applications	8 (10%)	15 (18.8%)	10 (12.5%)	20 (25%)	27 (33.8%)

4.10 User Personality Learning Characteristics

The question sort to the girls user personality characteristics towards use of ICTs in learning. This placed emphasis on learning styles, preferences, needs, habits and attitudes. The responses were rated on a scale of 1 to 4 where 1 indicated strongly disagree, 2 indicated disagree, 3 indicated agree while 4 indicated strongly agree. A question sort to find out whether respondents subscribed to online communities (e.g. Yahoo messenger, MSN messenger, etc) where they share learning experiences with others. 37.5% of the respondents disagreed while 62.5% of the respondents agreed. On whether respondents are fluent in the use of social networking media, 27.5% disagreed while 72.5% agreed. A question on whether the respondents have been able to generate some useful learning materials/content through collaborative engagement, 17.5% disagreed while 82.5% agreed. Concerning whether they prefer peer-to-peer group learning to teacher-led classroom learning, 35% of the respondents disagreed while 65% of the respondents agreed. On whether they prefer independent learning to group learning, 32.5% of the respondents disagreed while 67.5% of the respondents agreed. On whether they prefer problem-based learning challenges that employ their prior experiences, 18.8% of the respondents disagreed while 81.2% agreed. A questions on whether respondents prefer learning at my own pace to learning in timed periods, 20% of the respondent disagreed while 80% disagreed.

Table 2: User Personality Characteristics

User Personality	Strongly Disagree	Disagree	Agree	Strongly Agree
Belonging to online community	14 (17.5%)	16 (20%)	30 (37.5%)	20 (25%)
Social networking media use	8 (10%)	14 (17.5%)	25 (31.3%)	33 (41.2%)
Collaborative engagement with peers	6 (7.5%)	8 (10%)	24 (30%)	42 (52.5%)
Peer-to-peer group learning to Instructor led	14 (17.5%)	14 (17.5%)	27 (33.7%)	25 (31.3%)
Independent learning to group learning	9 (11.2%)	17 (21.3%)	24 (30%)	30 (37.5%)
Problem-based learning challenges	8 (10%)	7 (8.8%)	24 (30%)	41 (51.2%)
Own pace learning	7 (8.8%)	9 (11.2%)	24 (30%)	40 (50%)

4.11 Correlation Analysis

A correlation analysis was carried out between the heutagogical ICT devices and applications against user personality characteristics for girls to find out if there is any relationship. Results indicate that belonging to online community significantly correlated with Heutagogical ICTs with a positive value of 0.283 with a p value of 0.011. This indicates that the more available heutagogical ICTs are, the more girls will join online learning communities. Social networking media use significantly correlated with Heutagogical ICTs with a positive value of 0.250 with a p value of 0.025. This indicates that the more available heutagogical ICTs are, the more the girls will be fluent in use of social networking media in learning. Collaborative engagement with peers significantly correlated with Heutagogical ICTs with a positive value of 0.328 with a p value of 0.003. This indicates that the more available heutagogical ICTs are, the more the girls will collaboratively engage with peers in learning. Preference of peer-to-peer group learning to Instructor led significantly correlated with Heutagogical ICTs with a positive value of 0.296 with a p value of 0.008. This indicates that the more available heutagogical ICTs are, the more the girls will engage in peer-to-peer learning. Preference of independent learning to group learning did not significantly correlate with Heutagogical ICTs. Preference of problem-based learning challenges that employ my prior experiences significantly correlated with Heutagogical ICTs with a positive value of 0.279 with a p value of 0.012. This indicates that the more available heutagogical ICTs are, the more the girls will be challenged to engage in problem based challenges. Girls' preference of learning at their own pace to learning in timed periods significantly correlated with Heutagogical ICTs with a positive value of 0.243 with a p value

of 0.030. This indicates that the more available heutagogical ICTs are, the more the girls will be encouraged to learn at their own pace.

Table 3: Correlation

	Heutagogical ICTs	Belonging to online community	Social networking media use	Collaborative engagement with peers	Peer-to-peer group learning to Instructor led	Independent learning to group learning	Problem-based learning challenges	Own pace learning
Heutagogical ICTs	1	0.283* 0.011	0.250* 0.025	0.328** 0.003	0.296** 0.008	0.121 285	0.279* 0.012	0.243* 0.030

* Correlation is significant at 0.05 level (2 tailed)

** Correlation is significant at 0.01 level (2 tailed)

4.12 Heutagogical Learning Model for Girls

A correlation carried out in table 3 on Heutagogical ICTs and user personality characteristics indicated positive significant correlation between most of the user characteristics and heutagogical ICTs. Only those characteristics that were statistically significant were used in the development of the model. The characteristics were belonging to online community, fluency in social media use, peer to peer collaborative engagement, problem-based learning and own pace learning. Collaborative engagement with peers had the highest contribution (0.328) in Heutagical learning. This indicates that for the girls to effectively use ICTs in learning, they need to be encouraged to share knowledge of what they know with peers to be able to obtain new knowledge. The second highest contributor of girls' use of ICTs in learning was the preference of peer-to-peer group learning over Instructor led learning (0.296). This indicates that the role of the facilitator needs to be minimized for the girls to achieve the self-determined learning. The third contributor of girls' use of ICTs in learning is belonging to an online community (0.283). In online community, girls share common goals and are encourages to share experiences. The fourth contributor of girls' use of ICTs in learning is the availability of problem-based challenges (0.279). This triggers girls think about their prior experiences and get to find a solution to the problem presented. The fifth contributor of girls' use of ICTs in learning is the social media use in learning (0.279). This presents a variety of ways in which they can share knowledge. The final contributor to girls' use of ICTs in learning is learning at own pace (0.243). Girls face several challenges in society such as using their learning time as care givers thus limiting them in learning. In such a case, when given an opportunity to learn at their own pace using ICTs, it will bring a positive impact in their study. This in long run enhances lifelong learning.

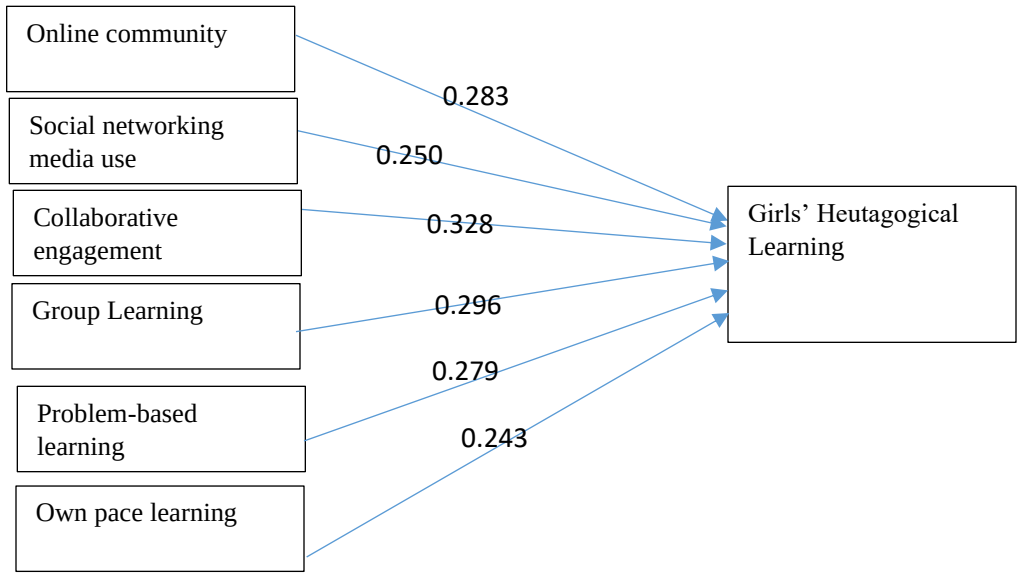

Figure: Girls' Heutagogical Learning Model

5 Conclusion

The adoption of blended and online learning in institution of higher learning was a major boost since it provides for access to knowledge from a large population that may have been left out due to the physical unavailability. Adoption of heutagogical learning in girls enables them to develop a sense of curiosity for learning and are more open in education. This study proposed a girls heutagogical learning model whose constructs were based on their personality characteristics in using ICTs in education. This model is hoped to assist institutions of learning to have an inclusive approach of learning for girls.

References

Ancheta-Arrabal. A., Pulido-Montes C. and Carvajal-Mardones V. (2021). Gender Digital Divide and Education in Latin America: A Literature Review. Educ. Sci. 2021, 11, 804. https://doi.org/10.3390/educsci11120804

International Telecommunications Union (2017). Measuring the Information Society Report 2017 Volume 1

Kuroda R., Lopez M., Sasaki J. and Settecase M. (2019). THE DIGITAL GENDER GAP. Policy Brief.

Lynch M., Sage T., Hitchcock I. and Sage M. (2021). A heutagogical approach for the assessment of Internet Communication Technology (ICT) assignments in higher education. *International Journal of Educational Technology in Higher Education.*

Marie B., L and Hase S. (2015). Heutagogy: A Holistic Framework for Creating Twenty-First-Century Self-determined Learners.

Ojokoh B., Zhang M., Oluwadare S. and Akintola K. (2013). Women's Perceptions and Uses of Information and Communication Technologies in Nigeria and China: A Comparative Analysis. *Information Management and Business Review* 5 (4). ISSN 2220-3796

Ojokoh, B. A. (2010). Empowering Nigerian Women Using IT: Practical Strategies. *Journal of Educational Administration and Foundations*, 20(1).

Olatokun, W. M. (2007). Availability, Accessibility and Use of ICTs by Nigerian Women Academics. *Malaysian Journal of Library & Information Science*, 12(2), 13-33

Ozan Leylum, Ş., Odabaşı, H. F. and Kabakçı Y., I. (2017). The Importance of Case Study Research in Educational Settings. Journal of Qualitative Research in Education, 5(3), 369-385. www.enadonline.com DOI: 10.14689/issn.2148- 2624.1.5c3s16m

Rowntree, O. (2018). GSMA Connected Women–The Mobile Gender Gap Report 2018. Report. GSMA, Cambridge, MA.

Singh S., Singh S. and Kumar A. (2019). Women and ICT: A Study on Access and Perceptions in North India. *Indian Journal of Human Development.* https://doi.org/10.1177/0973703018818588

Sosa, O. G. and Manzuoli, C. H. (2019). Models for the pedagogical integration of information and communication technologies: A literature review. Ensaio: Avaliação e Políticas Públicas Em Educação, 27, 129–156. https://doi.org/10.1590/S0104-40362018002701720

Thakur G., R. (2017). Heutagogical Learning Efficiency Model to ICT Integration in the Classroom. International Scientific *Journal of Contemporary Research in Engineering, Science and Management (ISJCRESM)* ISSN: 2456–1134, 2 (2)