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Engendering Education for Human Capital Accumulation & Sustainable Development: A Case Study of Allama Iqbal Open University from Pakistan

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KEY WORDS

Human capital, smart education, sustainable development, qualitative methods

ABSTRACT

All over the world, education is realized as a driver for sustainable growth and productivity. The only way to accomplish that productivity and sustainability is to not only to enable humans to secure an education but to produce human capital. Pakistan is a signatory to many international treaties and conventions which reiterate the need to accomplish sustainable development goals by providing equal rights of education accessibility to all - men, women and/or the people of other genders. This qualitative study sought to investigate the role of Allama Iqbal Open University (a distance learning institution) in the accomplishment of the desired targets. For this purpose, a thematic analysis was conducted which followed Braun and Clarke's 6-step thematic analysis (2006). It sought to probe how far this institution had progressed in achieving the purpose to provide students with academic and practical knowledge, while enhancing students' capabilities through SMART (S stands for self-directed, M for motivated, A for adaptive, R for resources and T for Technology) education to turn them into successful professionals & productive citizens. In order to achieve this, primary and secondary sources were used. It suggests that there is a great need to upgrade and revise the past educational system for educating students' vis–a-vis formulation of new policies which relate to sustainable development in order to realize the smart education vision in future.

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Introduction

The present study focuses on the education vision pursued through smart education for human capital accumulation and sustainable development in Pakistan. As education has emerged as a significant component and variable in recent times that can help to advance countries' human, economic and

social development so, there is a need to ensure equality based learning opportunities to all to reduce inequalities, produce functional literate individuals and develop sustainable environments and conditions for progress to be achieved. This research aims to study smart education as a crucial component for the realization of universal, functional, skill based education. This study incorporates the findings of past research which underscored the significance of ICTs and extended the literature by filling the gap especially on smart education by covering four major dimensions that comprised; smart education, gender equality, human capital accumulation and sustainable development. It studies the engendering of smart education vision with a focus on gender equality and sustainable development to ensure that irrespective of a student's gender, the treatment, policies and implementation are based on a gender equality model, while the individuals are trained in a manner so that they might play their part in economic progress and growth, thus bringing to fruition "human capital" for achieving sustainable development.

Engendering Education has been a UN vision from the inception of MDGs. Due to the non-accomplishment of MDGs five targets, the UN has introduced seventeen goals which are known as Sustainable Development Goals 2017 (SDGs). Currently, the goal four, '*Quality Education'*, goal five *' Gender Equality*' and goal 10 '*Reduced Inequalities'* of the Agenda 2030 of SDGs seek to ensure that the gender gap between the genders as well as their understanding, research capacity, and development are ensured by balancing the inequalities wherever they exist in any form; pedagogical methods, curricula or resource utilization (UN , 2019).

This endeavour has been strongly promoted in the recent times (Kwet& Prinsloo, 2020). The reason is that it is perceived that the emerging nations with low enrolments of girls/women or the marginalized sections and dropout rates can resolve their issues pertaining to the deprivation of educational opportunities through online and digital education systems. To facilitate this process, the concept of SMART education was introduced. The biggest advantage of SMART education is that it doesn't require students to allot time out of their busy life for educational attainment but rather they can become educated through the online and digital mode of education where they can study at their convenience and pace. However, Zhu et al. (2016, p. 3) mention that until now, there has not been a "unified definition of SMART education"; yet it has been discussed and under discussion by multidisciplinary experts and scholars (Morze, Smrnova & Glazunova, 2017). Morze, Smrnova and Glazunova (2017, p.1) highlights a need to differentiate between e-learning from smart education where smart education is a set of technological means , services, use of internet that are used by trained people to contribute qualitative changes in the interaction of

subjects. As a result allow to receive various social, economic, and social effects that make life better.

According to Jongwon SEO (2012), SMART is an abbreviation for five highly important concepts and dispositions where S stands self-directed, M for motivated, A for adaptive, R for resources and T for Technology. So, SMART education is defined as customized intelligent teaching and learning. Its primary goal is to provide students with highly personalized education which needs to cater for diversity timely and creativity focused. In addition, it highlights a focus on descriptive, qualitative and quantitative assessment of all students irrespective of class, creed, status, race, ethnicity or gender.

It is possible that a country such as Pakistan which has a population of 207,774,520 (census 2017) could achieve the target of 100% literacy by applying multiple tools and models (Azeem & Ismat, 2016, pp. 647-654) like that offered through SMART education. Use of SMART education could prove to be a worthwhile option (BegoñaGros, 2016) to deal with the socio-economic and demographic or cultural issues which cause low enrolment and a high dropout rate in Pakistan (Sultana, 2017, pp. 164-170) This could occur through the fruits of globalization, advancement in the use of ICTs, and enlisting the benefits of advanced digital technology which is turning the world into a smart society described as 'an empire' (Hardt & Negri, 2000). In many parts of the world, the idea of Smart societies has been realized with this goal being promulgated in universities.

Globally, both formal and informal universities have established Open and Distance Learning (ODL) systems that are based on the notion of SMART Education. To promote such education, digital technology is considered as an imperative to be used in order to replace the old, static, one way, one-size fits all mode of teaching and education (Chatti et al. 2010 pp. 66-67). So, SMART education through the use of digital technology is not just adopted as a mode of education but is considered a paradigm shift for digital natives where students are not only informed of its potency through word of mouth but are provided with skills to make use of the contemporary technology. In Australia, South Korea, China and many countries around the globe this is already being realized with a lot of work being accomplished since 2012.

In Pakistan, AIOU is the pioneer user of ICTs. It established an ICT Directorate which worked to provide many of its department with facilities to equip them for educating students online or through a digital system of video conferencing etc. Currently, AIOU is offering a wide range of courses through various online application systems. Yet, the dream to establish AIOU as a SMART University is yet to be realized fully.

As far as materializing the education vision through SMART education is concerned, there are multiple role models from formal or informal schools/universities and even from voluntary workers around the

world who provide online material and resources which are available to anyone free of cost. For instance, the World Bank acknowledged the Khan Academy as a pioneer of free YouTube OERs since 2006 highlights its significance. It is the first academy to start making available digital education resources on YouTube and, as such, has emerged as a role model for many others. That explains why the World Bank and United Nations forums have highlighted the component of engendering ICT by which the main aim is to transform the way of production, dissemination and sharing of information and educational materials. As SMART education and use of ICT offers flexibility of time, space and easy access to knowledge and productive means, it not only ensures a way out of isolation, acts as a tool for economic development but importantly offers a valuable resource for women who have limited time, space and knowledge especially in developing countries like Pakistan (The World Bank, 2016)

In pursuit of this vision, AIOU established its web based TV, and YouTube channel in 2016. The provision of advanced Wi-Fi facility through Eduroam services to administrative staff, teachers, and students enabled them to freely access the internet in all open and indoor areas within the campus and in the visiting institutions or universities as well to enhance research activities and for better use of Smart phones. The reason is that, the experts say that Smart devices should not only be treated as a tool for technological advancement but rather needs to be treated as part of a paradigm shift which might precipitate immense progress and fruitful outcomes (Mirza, 2019).

In many parts of the world, especially in China, advanced technology through artificial intelligence has penetrated the whole educational systems. Artificial intelligence refers to the intelligence demonstrated by machines. In addition , the use of robotic education, mobile robotics education and other such smart educational tools have been the focus for experimentation successfully in China where artificial intelligence has revolutionized the whole system and education and they are continuing to look for other ways to advance their educational systems and institutions by efficient use of technology. However, there remains a great debate how to use the technology intelligently while not ignoring its social negative effects. So, a few researchers suggest that social scientists especially those working on gender equality must work on “ethical robotics and artificial intelligence” (Walker, 2007).

In Pakistan, a few universities and schools are training students in robotics and artificial intelligence yet the data on smart education in Pakistan with reference to gender equality, human capital accumulation for sustainable development goals is minimal. This research aims to fill the gap by studying how SMART education has helped to realize the dream of smart education for human capital accumulation and sustainable development by studying the case of Allama Iqbal Open University, Pakistan.

Rationale of the Study

The study's rationale is to examine SMART education in relation to sustainable development. The studies on smart education have been mostly undertaken by educationists whose primary concerns are pedagogical techniques, teacher-student interaction ethical dilemmas related to technology use in classrooms, and so forth. In contrast, this study looks at Smart education through a gender lens which provides a focus on how smart education can better facilitate gender achievement existent in Pakistani society. It looks at the four dimensions of smart learning which have not been previously investigated. The four dimensions are highly significant in relation to quality and equality based learning by promoting: a) *Gender Equality* -this dimension seeks to identify the many ways of empowering genders at AIOU, an organization which plays a significant role in accomplishing the targeted goal of gender equality; b) *Smart Education* - the first dimension seeks to question how the digital technology impacts individuals irrespective of gender; c) *Human Capital Accumulation* - human capital manifests as a stock of knowledge, social and personal characteristics, habits that are characterized by the creativity and ability to perform such tasks, and labor and acts that produce economic value. This dimension explores the role of education from AIOU and how it impacts the personal, social, economic lives of the students (of any gender), especially in making them successful professionals in any field of interest or specialization; and d) *Sustainable Development Goals* - this dimension probes the role of education held at AIOU for the sustainable development not only at the human level but, at institutional and national levels as well.

Conceptual Framework

The study employs a feminist pedagogical framework which aims to create new standards in the educational system; where the educational system, student teacher interaction, and classrooms mainly as "liberating" entities which work without the binary of right and wrong, and with an emphasis on creating a mode of education where skills and knowledge acquired by a student are not just limited to their class, school, university only but are broad enough to capture and impact whole society (Bell Hooks, 2014, 1994). This theory helps to represent SMART education as a "necessary prerequisite" for attaining the goals of universal education in Pakistan specifically as illustrated by development practitioners.

Methodology

The research, primarily qualitative in nature was conducted in Islamabad. Informal and in-depth interviewing was used as data collection tools with students, teachers and administrative staff members of AIOU, Islamabad, Pakistan.

Population and Sample

The population of the study comprises 42 participants. However, for this paper the responses of 27 participants are included: 5 male students, 5 female students, 5 male teachers, 5 female teachers, 2 administrative male members, 2 female administrative members , 1 male alumnus and 2 female alumni . For the conduct of the informal interviews, students were contacted in coffee shops, cafeterias, and campus lawns. Some of the administrative staff members and faculty members were also included in the informal interviewing. The number of informally interviewed participants included for this paper is twenty (20). All participants in the informal interviewing were selected by using the convenient sampling technique. Whereas, for the in-depth interviewing seven participants' responses were included: the two administrative officers, three academic stakeholders, one differently-abled student and one transgender student are selected through the purposive sampling technique. Informed consent was received from all of the 27 participants.

Instrumentation

In the informal interviewing only four simple questions were asked related to the four dimensions discussed below. Whereas, the participants involved in the in-depth interviews were questioned on a combination of eight predetermined questions and unscripted probes related to the four dimensions; engendering the gender equality vision, smart education at AIOU, human capital accumulation and sustainable development goals. The instruments were validated through Spector's preliminary framework (2014) for smart learning environments. These were also tested on a pilot basis and then the terminology used was redefined accordingly to make it more understandable for the students. The data was analyzed using critical social analysis which allowed for a critical examination of the case under study.

Procedures for Data Collection

The data were collected through two primary sources: Informal interviews and in-depth interviews; secondary sources are also utilized which included the contents of AIOU's Jamia Nama, the already available research studies, the ex-vice chancellor's interview available on web and AIOU YouTube channel, columns and the news about the university gleaned from various Urdu , English daily national newspapers. Before starting the informal and in-depth interviews all requirements were fulfilled. For the in depth interviews, the complete interviews are recorded using smart phone to ensure good quality audio. Most of the informal interviewing with each participant lasted around 5-6 minutes while the in-depth interviews lasted for 55-60 minutes. All participants were contacted during university hours from 8am to 4pm during February 2019 to March 2019.

Findings

The data was categorized into two parts. The first part related to the data which gave detailed information of the general responses about dimensions of smart education, and its links with sustainable development goals. For the thematic analysis the 6-step framework by Braun & Clarke (2006) is followed that comprised: 1) becoming familiar with the data by re-reading carefully; 2) identifying initial codes; 3) searching for themes which capture something significant and interesting that relate to the research questions; 4) reviewing the identified themes in order to review whether the identified themes really provided useful information about the research questions; 5) defining the themes finally which in Braun and Clarke 's words mean " the final refinement" stage of the themes which aims to "identify the essence of what theme is about (2006, p. 92); and 6) writing up an explanation of the data in the form of analysis.

Most of the participants except the two HOD and the DICT remain bilingual (Urdu-English) in giving their responses. So, all the Urdu responses were later translated into English. A facilitator who edited English texts was requested to cross check the English translation. During analysis important words of the students, teachers and administrative were quoted verbatim. The names of the administrators remained anonymous and each participant's role at university was written in abbreviated form to maintain their confidentiality.

Part I: Smart Education not Optional but Compulsory

The secondary data evidenced that there is a need for state and institutional policy to realize the smart education objective. World Economic Forums' blog (n.d) reviews Schwab's concerns (2017) that, although there is so much new and unique which can play a role in resolving many of our problematic issues, the major concern resides in the fact that governments, organizations and institutions may not be ready or equipped in a timely manner to "employ and regulate new technologies to capture their benefits". In this regard, the data available on the Presidential Initiative for Artificial intelligence and Computing (PIAIC) explains that the present government intends to work for smart education and to train people especially for working on artificial intelligence to speed up the delivery and quality of the systems. Dr. Arif Alvi, the sitting President of Pakistan in his various interviews and blogs has mentioned that

> We are living in a world where fourth revolution of technological advancement has come. In this world, the education through artificial intelligence, robotics and, cloud computing etc. has revolutionized the physical, digital and biological worlds and thus the knowledge at this time questioning what and why it needs to be a human". During a Conference CAKE-Tech 2019 at AIOU, he suggests that there is a need for each institution to become prepared to adopt "what's knocking at our doorstep" (CAKE-Tech 2019).

This conference "CAKE-Tech 2019" which was held in collaboration with various universities of Norway, China and Pakistan and through the assistance of the Higher Education Commission of Pakistan (HEC) also aimed to develop collaboration between educational actors to use smart education to resolve many issues pertaining to the current generation with the cheap use of labour, meet the cost and provide the time.

The responses from the informal, semi structured interviews explain the significance of smart education as a compulsory component of the contemporary educational system. A student of MA sociology asserted smart education as "a new paradigm that has revolutionized the whole educational system and without which today's education cannot meet its purpose". All of the 20 participants interviewed informally agreed to the provision of smart education. A student of BS Chemistry called it an "urgently needed phenomenon".

For HOD it represents "a paradigm shift". She observed that "the people who hesitate to accept the happening of this paradigm shift must realize that the "fourth revolution, the digital revolution has come". The DA describes smart education "as a prerequisite of modern times which is needed from the registration of the admission till completion of the degree and every step of students' professional life as well". He also mentioned that "the pro-technology students are always successful in today's world so smart education is the need of hour". Others also mention its significance in the today's world as an essential component.

Engendering Gender Equal Smart Education: The responses from all 27 respondents (selected for this paper) evidenced that engendering education with a smart vision should be accomplished on a "gender equal" basis. It has also been viewed as "equal provision of education", which is "empowering" and providing "an education that produces liberating individuals".

In addition, smart education's link with gender equality is differently explained by each of the respondents during the semi structured interviews. For the AP, engendering gender equality, smart education means "equality of the two mainstream genders and the transgender as well". She adds that engendering also means "providing more opportunities to those who lag behind, like women". She also asserts that "online classrooms facilitate the people of the other genders who find difficulty in coming to class on regular basis or avoid to interaction due to the taboos and stereotypes attached with them". She stresses that the online systems were really helpful to such people and that was why a few transgender students were working in business administration program as well.

Conversely, the HOD expresses an unwillingness to call women as "minor" and "marginalized but they are not equally treated in the society". For her, "education should not be gendering with a "label of providing security and safety". She stated that engendering gender equality through smart education meant that education that "works as an incubator" where

each individual "feel safe, and prepare himself/herself to face the challenges of the external world". However, she asserted that provision of "safe and secure classrooms environments" must not be adopted strictly in a way that limited interaction. Instead, "interaction should be retained because we do not want to turn our students into individuals who avoid face to face interaction with the people of the opposite sex or other genders and *thus feel safe* while studying through online mode".

DICT views engendering smart educational system as "a holistic system, which might not be possibly implemented right away, however, that must focus at all aspects; user requirement, establishment, implementation, and audit to control to ensure quality being delivered, and ease of access to the students in a way that they are attracted to use technology and automated systems at their own will and not by any "push". DICT and DA also favoured the concept of inculcating an approach of engendering smart education to bring the people of all groups into the mainstream world for the success of the individual as well as for the society and nation.

Smart education: A way to achieve Sustainable Development Goals: The responses on the third dimension investigated illustrate that all of the respondents considered smart education as a way to achieve sustainable development. The respondents viewed it as a "mechanism" and "strategy for achieving sustainable development", as described by a student of EPM. AP for instance, gave an example of the artificial intelligence in today's world and how it is going to revolutionize the whole educational system. The "world is seeking new ways of educating people through artificial intelligence where computers speak instead of the teachers and every day its opening up new corridors to advance educational systems"; her opinion explains how dominant artificial intelligence might become and how smart education might be transacted through the creation of assistance apps and software for studying business information, natural sciences and information sciences to realize the sustainable development goal of "education for all" , "universal quality education" and "ease of access to education".

HOD asserts that smart educations works as "a milestone for the achievement of SDG 4, 5 and 10 which addresses inclusive, quality education for all, gender equality and reduction of gender inequalities respectively". She mentioned that "on individual level pro-techno education and pro-digital education facilitate students not only in their learning but also turn them into skill based individuals, equipped with using multiple software, surfing globally and getting benefit from others' instantly through their smart gadgets and devices."

A few alumni who were visiting the campus, mentioned smart education's linkage with SDG's achievement as really significant. An alumnus student who is preparing for the CSS exams discussed "quality education with smart education vision can better facilitate students of

modern times in an efficient way where in minimum time; they access more materials and open access resources".

Smart education produces smart human capital: The responses of the students, stake-holders and the participants demonstrate that education with a vision of smartness, quality, and ease of access and gender equality that creates smart individuals who are the best "capital" for an institution, a society and a nation was the way forward. HOD asserted that "the students who have been given a wide room to play while they are provided with equal opportunities, technological information, and skills are real resource for an institution, society and the country. She clarified that by suggesting that "institutions don't create job market, however, the smart individuals who create the job market was once the students, so it's how these job market creators were produced totally relies upon the institutions".

A student of BS Chemistry on campus noted that "if a university produces smart individuals they eventually do not wait for the jobs to be created but the smart education enables them to create jobs in the digital world". She signifies the importance of skilled individuals and gives the example of the top five business men in the world who achieved great success due to being skilled, competent, and efficient and pro-techno.

PART II: About AIOU

Part two deals with the information about AIOU, its system, its operational setup regarding the four dimensions mentioned above a) smart education b) gender equality c) gender and human capital accumulation d) gender and sustainable development. The data collected through informal interviews and interview schedules show that most of the students, stakeholders and the people working at AIOU in different positions consider that the university is playing a great contribution, being first ever distance learning institution in Pakistan. In this respect a few called it "a light of hope for many marginalized sections of the society" and "a good option".

AIOU as SMART Institution: In response to the question, is AIOU offering SMART "self- directed, motivated, adaptive, resource-based and technology-based" education, students' responses are mostly positive. A student of MS, CS responds "AIOU provides excellence through its facilities, services and management"; another opined that "it offers quality education". Another response explains that "the university offers smart education but not completely as it is self-directed , motivated and adaptive however there is a need to work out the other two components : efficient access of recourses and technology".

The responses from the in-depth interviews also show that AIOU has always been a "pro-technology institution". For most of the respondents, since its inception AIOU has a component of audio-visual aids to facilitate its students. AP and DA mentioned the contribution of Ex-Vice- Chancellor for the steps been taken to realize the dream of a "smart campus" and how it

was still in the process of transformation. They discussed the vision of the present sitting head of the institution and administrators on campuses that are willing to work at their best.

An alumnus of B.Ed. mentions the time when she really wished to have best internet facilities, computers and soft materials available to her. However, at that time only CDs, allied material and books were sent to the home addresses. She shows happiness on the digital access of the library, availability of Wi-Fi and internet, at all campuses of AIOU.

Out of the 15 students, 10 also responded in regard to the interview schedules that the Wi-Fi facility at campus provided, internet access available at the library, and access to universally known recognized resources available for students. For these students, the university campus has strong "Wi-Fi connection". Whereas, the other five students were of the opinion that "there is a need to get an excellent band of internet facility available for students at all campuses, and regional campuses as well". These students opined that the students in far flung areas were not trained to use the resources in a systematic fashion which explained why they faced problems accessing resources and other information regarding their admission, confirmation, books tracking etc. This issue was also discussed by HOD who in her interview asserted:

University has provided the utmost resources to students but due to the mass of the students at undergraduate level the orientation sessions are not conducted at all study centers and regional campuses as they are designed. Therefore, a small chunk that come at main campus for post graduate level courses get access to the services but others' don't.

With regard to question how smart education digitization policy worked as a base, the responses on the AIOU's digitization policy illustrates that AIOU has not yet developed any digitization policy document and/or that is not available on its website; however, it has developed its digital policy regarding library services which was developed during 2016-2017. However, the interview responses especially from the HOD who worked with the executive committees notes that while such a policy has been formulated, it has not been approved by the higher authorities. DICT also related that the digitization policy for the Smart system has been prepared and been approved by the internal committees though the steering committee needed to work on it further and then it would be finalized and then approved by higher authorities and councils.

Students' responses revealed that they believed that AIOU must have a digitization policy which ensured delivery of the information regarding admission, mailing of books, tracking systems of degrees, complaints, tutors, results and degree courses available and all information needed to be integrated effectively.

DA in his interview also mentions that although there is not a written document for digitization of AIOU, the whole system of admission,

admission tracking and complaints is working well through the systems under the auspices of the Computer Centre where students could not only get this information at university websites but students could also be informed through SMS on their mobile numbers (provided) at each stage. He stated that the students who did not read their prospectus thoroughly, and did not view the academic calendar remained concerned all the time. It was suggested that f the students read their prospectus carefully they would be in a position to find the right way to obtain information and resources as well.

The DICT states that the AIOU is working to bring 'education into a box" which will allow students, tutors, teachers, resource persona, administrative staff and all stakeholders to reach the relevant information with ease. He also said that "our systems speak of our policy" and the decision to make a digitization policy rests with the steering committees. Further, he asserts that in the contemporary world when we are moving towards greater reliance on artificial intelligence, the AIOU at the technological level is in its infancy stage. This is because we have not yet made those systems which are currently available to students in other parts of the world for several decades now. As well, we do not have data, "integrated data", and 'data with integrity" that are the basis for working on artificial intelligence". He was hopeful, however, that the current sitting head of the institution is working on these projects as this is his core priority area and that it was his vision for the future too.

Gender Equality& Reduced Inequalities at AIOU

The informal interviews with the stakeholders in different positions at AIOU who have been pioneering various areas of work at AIOU shared that AIOU has been established in 1974 with an aim to provide education at doorstep to the students of all age groups irrespective of any gender and with a focus to provide education to women who cannot afford to come to formal institutions for studies on regular basis due to household duties, cultural issues and poverty. With the passage of time, AIOU has initiated many steps to entertain poor segments, and the marginalized groups. In this respect various scholarships programs were imitated, program to give free education to women of far flung areas especially FATA, the differently-abled individuals, prisoners and the transgender have been started to bring all segments of the society into mainstream[11]".

DA mentions in his interview that various scholarship and financial schemes have always been there to facilitate students who cannot study due to poverty or socio-cultural issues. Students' responses on interview schedules also cited that many of them have availed themselves of the scholarships. Many of the students mention that they really benefited from the "earn to learn scheme" which not only mitigated their financial problems for gaining access to education but also enabled them to gain experience in their relevant fields of interest.

In addition to this, an academic also mentioned that "AIOU has its sexual harassment policy that works through a committee to establish the safe working and education environment at campus". However, there is a need for its improvement and conscientious implementation to reduce discrepancies. Another component which a point of focus is mentioned by DICT who states, "AIOU focuses on students and teachers privacy while they interact online on the LMS and Olive systems."

AIOU's Role for Human Capital Accumulation

The data from students' responses show that students have positive views on the question about the role of AIOU to develop them into skillful, professional, and competent individuals but their attitudes to their personal, interpersonal and social preparedness were diverse. A few students consider that AIOU has a great role in forming their present status. For instance, a female M.Phil. student asserts: "I started my study after 14 years. AIOU has great role in pushing me up to study, that's why for me AIOU is great." Another student of MA English literature states that his personality is "changed and refined", and turning him into a "compassionate and good individual". A TG student of Gender and Women studies shared:

> AIOU's environment especially at workshops is really encouraging. The teachers and students are really positive towards me. This raises my confidence level. When my family came to know that I am studying at AIOU and continuing my studies they started accepting me. Now almost 80 percent of my family members have accepted me as whatever I am and want to live.

Most of the students said "yes" for the answer that AIOU has turned people into skill full professionals and confident about themselves. On the other hand, some participants held different views. For instance, AP stated that "as AIOU offers a self-directed mode of study so it rests with the students how much they want to get benefitted from the opportunities they are provided with". She gave a few instances where some of the alumni she know are in managerial positions and are working really well. HOD comments: "Definitely AIOU is producing human capital which is working at various levels and fields in the country". She refers to the LinkedIn page of AIOU, which gives information of the competent alumni. However, she noted, "there are many more who are not at LinkedIn or on such forums that gives information of our professionally competent alumni". She refers to the programs that especially train students for technical jobs. So, the data suggest that AIOU is producing human capital which is exercised in various fields. In this respect, an alumnus of MSc Gender and Women Studies asserted that "the education at AIOU has fixed a gender lens which has made me to better understand the world and to improve it from individual to societal level". Another student of BS biology asserts that "the studies at AIOU really improved my confidence and skills yet if the major concerns of

the students be dealt in an efficient manner, AIOU can produce *a cream of smart creative individuals* far better than any formal system students".

AIOU and Sustainable Development Goals:

The data collected demonstrates that AIOU has not made public any policy to delineate how it will reach its sustainable development goals neither on its website nor in any of its "Jamia Nama" or "Monthly News and Views" (the two newsletters). The interviews with stakeholders and the in-depth interviews with the academics illustrate that many of the AIOU's policies are in line with the SDGs for the provision of universal education, education of marginalized groups, and directed to end gender disparity and reduced inequalities.

HOD in her interview claimed that the AIOU 's first policy which is "education for all", and "education at your doorstep" relates to the SDG 4 which seeks equal opportunities to access education. However, she also mentions that "a feature missing on which we are working and trying to achieve is the *quality*. We have made ease of accessing education possible but now there is time to work out *quality maintenance of education*". AP mentioned that they were working on the lines SDGs defined, however our pace is really slow which needs to be steady and efficient. We have systems but the upgradation of hardware is required. The DICT response also makes this evident, that is, that the AIOU policy on Smart education aims to achieve the best techno-education and skill based education possible; but it is in *"infancy phase"* and therefore there is a long way to go to achieve the goals fully.

Discussion and Conclusion

The primary data evidenced that in respect to engendering smart education for human capital accumulation and sustainable development AIOU policies are on "ad-hoc basis and supply driven", motivated by the individual/Government led-interests of the stakeholders (the Chancellor/and Vice Chancellor) who have worked in the university for a period of four years. Sattar also explored it in her work (2013, p. 11) that how in Pakistan educational policies are driven and on adhoc basis.

In Pakistan, the Chancellor of a university in Islamabad territory is the country's President who is the ceremonial head while the Vice Chancellor is the sitting head of the institution. So, what has unfolded is mainly based on the vision and mission statements of the sitting government and their interests in how to run educational institutions and which areas to prioritize. These supply driven policy agendas, however, make little contribution; sustainable development agendas can only work if these policies are current priorities. The AIOU which is established in 1974 is formed to facilitate people in disadvantaged areas and marginalized sections of the population under the banner "education for all" irrespective of any age. So, the initial programs have focused on Taleem-e-Balighan "senior citizen's education"

adult literacy. However, the data available at UNESCO website for the literacy rate of Pakistan signifies alarmingly that no significant advancement has been made.

Table.1. UNESCO Statistics on Literacy rate in Pakistan 2015	Total	Female	Male
15-21 years	72.8	65.55	79.77
15 years and older	56.98	44.28	69.07
65 years and older	25.29	9.96	35.71

The hidden message drawn these statistics shows that improvement has been slow and in a way that fails to "attract" people. Thus, it does not have the momentum or influence to attract people into education for the improvement of their lives.

In addition, the data gathered also evidences a need for the "practice of freedom "as an educational strategy through use of smart educational systems. Bell Hooks (1974, p. 152 ; 2014) called for "an education which calls for freedom and transgressed education model that allows the students, teachers and all involved in this process 'empowered interactions'". Thus, transgressing education through a smart means of education where technology related resources, are central the classrooms "in digital and online modes" becomes a site "where we (the teachers-students) are all empowered in different ways (p.152).

Thus, such an education as Chung Young Ai (2016) argued is "an opportunity" as well as "a limitation". AP and HOD's responses explain both the opportunities and limitations inherent in this move. They discussed how, on the one hand smart education facilitates marginalized groups to study without being discriminated against, while promoting "mutual sharing, empathy, egalitarian, and gender equal thoughts, behaviors and services as well" that reduce replication of the old stereotyping which happens in traditional classrooms. On the other, it creates limitations by restricting students in interacting digitally and not physically for the most part. Thus, as Hook suggests, the education through smart systems needs to ensure "engaged pedagogy" (1974, pp.152-154).

The engaged pedagogical framework thus "desired" because Pakistan has "a cream of young lot", as stated by a student, which can work in the field of technology to increase efficiency of the organizations, and institutions as well. However, as stated by the HOD, online education or education through smart systems should not overlook the "interaction component" because if it should do so, it would create a "limitation" for women and marginalized groups. The limitation created by such a classroom or environment of study can be referred to as a *'locked library'* where a student can study inside but is not able to deliver it to others or it can be referred to as a 'bird cage' where they remain studying "flying" inside but

are not allowed to experience what's going on beyond the 'cage'. So, the data gathered suggests that the smart education needs to incorporate students' interaction component into its framework.

Critical social analysis through the lens of a feminist pedagogy framework also helps to investigate the dimension of smart education with a gender equality vision. It evidences that engendering smart education with a vision to be "gender equal", producing skill based competent "human capital" while maintaining a sustained development is highly demanding for a country like Pakistan, and for the AIOU institution as well. AIOU's steps to provide free scholarships to women and people in the far flung, backward areas, free education to transgender people with different abilities and prisoners. So, although it is a worthy initiative there is a need to equip all sectors with a technology which has adaptability, affordability, and flexibility for all students (Chung Young Ai, 2016) so that they might educate them as per their needs.

It has also been realized that the AIOU as a distance learning institution is lagging behind many of the universities in South Asia and Asia generally. In contrast, it was once the second Open University of the world and the1st Open University of South Asia. As DICT states AIOU is in *'infancy phase'* as far as technological advancement is concerned. This is an alarming signal as the universities which are supposed to bring changes in the societies must be at the fast pace than the other organizations and institutions.

So, the issue why AIOU is still in its infancy phase of technological advancement is due to the fact that does not have "big data" available as the corner stone of the digital revolution. The DICT mentioned in his interview that as soon as we have data for administrative and academic processes and procedures, we will be able to develop more advanced systems to work efficiently and with high quality. Lane and Finselin (Date) say something similar by stating that "university must need '*big data movements'* in order to reach the goals of smart education in contemporary world".

However, it has been noted that the half of the AIOU students who have participated in the study are not really informed about the recent advancement in artificial intelligence and its use for the establishment of a smart campus with a vision of gender equality, human development and sustainable development which poses questions on the quality of the education modules taught at the AIOU. This suggests that AIOU needs to revise its curriculum in a way that develop students' critical thinking, search for new concepts, and creativity so that they will be able to respond to current needs. However, DICT's response provides a ray of hope when he states that as soon as the AIOU has big data available, they will able to enlist artificial intelligence and cloud computing systems. He also stated that "the ethical use of technology will also be ensured when such systems will be created in future". Ethical use of technology especially in AI is very much a

focus for feminists who argued that the AI systems robotics, etc. promote stereotyping through coded algorithms by having only "female's voice" and question why most of the robots are usually configured as females not males. Thus, AIOU has to prepare its stem considering the ethical concerns.

The analysis of the data regarding the use of smart education for human capital accumulation explains that for all participants especially for AP and the HoD "smart education has a vital role for human capital accumulation". AP states, "the present education system of AIOU is mostly self-directed which means it's up to the students' willingness how much they want to equip themselves and use the facilities and resources available, in this way if the smart education will be available to students since their initial schooling they will be trained enough to be creative and motivated". In this way, she suggests that all advancement lies with what kind of "human capital we have".

The same is suggested by many other researchers in smart education who mention that it is only possible if people are trained and adapt to the new ways of dealing with the technology not only for their own individual gains but for the society and the global world at large. Ronald T Chin in his blog (Apr, 2018) quotes from the famous fiction author Adrian Tchikovsky that all progress which we see today is due to the fact that it has been made by "*the improvement of the people, not by the improvement of the machines".* So, human capital accumulation by educating individuals in a manner so that they become smart individuals has great implications and is urgently needed. For this, the respondents and participants of the study suggested various ways by which universities can better train for increasing human capital which can work to provide momentum towards sustained development because humans are the essential resource for changing the world.

In conclusion, it is suggested that to attain sustainable development and in particular the sustainable development goals, there is a need to replace the conventional means of teaching because as HOD suggested, "if we cannot go to the far flung areas, can't provide guidance in time to the students of any gender, should we wait until we don't have the expensive budgets to appoint tutors, sending books, or we should devise systems that would provide education to students online". A student of computer science also questioned that "as Chinese are using robots for teaching, why can't we have them". Her query explains her eagerness to have such systems so that the universal, equitable, efficient, smart education to all can be made possible for achieving the targets of sustainable communities and sustainable nations. Thus, smart education is an urgent need; to be fulfilled however it must incorporate in their make-up ways to develop new systems which will promote gender equality rather than discrimination and inequalities.

References

Ashraf, M.A.,& Hafiza, I.I. (2016). E*ducation and development of Pakistan: a study of current situation of education and literacy in Pakistan* US-China Education Review B 6(11)

Gros, B. (2016). The design of smart educational environments. *Smart Learning Environments, 3*(1), 15.

Bukhh.Q. (2007). Empowerment of women through distance education in Pakistan. *Turkish Online Journal of Distance Education, 8*(4), 135-151.

Chatti, M.R. Agustiawan, M. ., Jarke, M. & Specht, M. (2010). Toward a personal learning environment framework. *International Journal of Virtual and personal Learning Environments (IJVPLE), 1*(4), 66-85.

China AI Development Report .(2018). Retrieved on 1 March 2019 from http://www.sppm.tsinghua.edu.cn/eWebEditor/UploadFile/China_AI_development_report_2018.pdf

Colbert, C. (2017). *The current and emerging legal, social, and ethical issues from robotics and artificial intelligence*. Retrieved on 1st March 2019 from https://techlaw.uottawa.ca/news/current-and-emerging-legal-social-and-ethical-issues-robotics-and-artificial-intelligence-four

Education re-imagined –Featuring Salman Khan. (June 22 2016). The World Bank Live.

Gill K.S. (1988). Artificial intelligence and social action: education and training. In: Göranzon B., Josefson I. (Eds.) *Knowledge, skill and artificial intelligence* (pp.77-91). Springer.

Gros, B., &Maina, M. (Eds.). (2015). *The future of ubiquitous learning: Learning designs for emerging pedagogies*. Springer.

Gros, B., & Maina,M. (Eds.).(2015). *The Future of Ubiquitous Learning.* Learning Designs for Emerging Pedagogies. Springer

Hardt, M., &Negri, A. (2001). *Empire*. Harvard University Press.

Hooks, B. (2014). *Teaching to transgress*. Rutledge.

Kwet, M., & Prinsloo, P. (2020). The 'smart'classroom: a new frontier in the age of the smart university. *Teaching in Higher Education*, 1-17.

Morze, N. V., Smyrnova-Trybulska, E., &Glazunova, O. (2017).Design of a university learning environment for SMART education. In, *Smart technology applications in business environments* (pp. 221-248).IGI Global.

Pakistan Observer. (Dec 5, 2018). *AIOU provides books for jails' libraries*.(2018). Pakistan Observer.

Sattar, M. (2013). *Exploring the role of English language as an academic gatekeeper in Pakistani educational system: Focus Rawalpindi – Islamabad*. Thesis library, Pakistan Institute of Development Economics (PIDE).

Schwab, K. (2017). *The fourth industrial revolution*. Currency.

Sultana N .(n.d.) Causes of Dropouts of female students at graduate levels of education in Pakistan. *City University Research Journal Special Issue*, 164-170.

Spector, J. M. (2014). Conceptualizing the emerging field of smart learning environments. *Smart Learning Environments, 1*(1), 2.

The Express Tribune . Oct 4, 2017).*AIOU offers free Education ProgrammeFor Transgender*. Retrieved from https://tribune.com.pk/story/1522666/aiou-offers-free-education-programme-transgenders/

Walker, U.M. (2007) *Moral Understandings: A feminist study in Ethics*. Oxford University Press

Zhu, Z. T., Yu, M. H., &Riezebos, P. (2016).A research framework of smart education. *Smart learning environments, 3*(1), 4. Springer Open.

Zhu, Z. T.,Yu, M.H., & Riezebos,P. (2016). A research framework of smart education. *Smart Learning Environments, 3*(1), 4.

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