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Understanding Multi-layered Conceptualisations of Innovation in Education

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Understanding Multi-layered Conceptualisations of Innovation in Education

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Abstract

Innovation is a difficult concept to pin down. Indeed, there are intense debates and deep disagreements about this topic. The same can be said for innovation in education. While it is agreed that education is vital for creating a sustainable future, innovation in education has disparate meanings for various actors involved in education. Innovation in education may be driven by a host of factors ranging from sociological constructs such as equity or gender to global phenomena such as COVID-19. Innovation also varies in nature and degree. It can be in the form of an augmentation on current educational practices or artefacts, or in terms of a radical change. Innovation can be building on existing or disrupting current educational practices and artefacts. It can be inspired or imposed by educational authorities. This paper seeks to understand how various stakeholders of the education sector conceptualise what innovation is in education, and how it impacts their sector. The stakeholders include policymakers, educators, educational cadres that oversee policy implementation and teacher educators. The data has been produced through online questionnaires and focus group discussions. These data were analysed through the lens of different taxonomies of innovation that constitute the conceptual framework of the paper. The findings indicate that each stakeholder has a unique conceptualisation of what innovation in education entails. These conceptualisations do have commonalities among them. More importantly, the findings indicate gaps that exist among the different views that need to be bridged for the successful implementation of innovative projects in education.

Key words: Innovation, innovation in education, educational innovation, evolutionary innovation, frugal innovation, technological innovation, product innovation

Introduction

Innovation is a contested concept (Marques Morgan & Richardson, 2017). There is little agreement on what is innovative and what is not. These debates often occur when there is no shared understanding of the concept. Indeed, innovation happens in different ways, typologies, scales and degrees of impact (Von Schomberg & Blok, 2021). The education sector is not immune to the debates around innovation. Debates sometimes turn into critical events that spur academics to further explore concepts and constructs. The claim that the beliefs of stakeholders in the sector on innovation are multivarious and are shaped by various elements needs to be backed up by data. Therefore, the focus of the study is to gather insights on the numerous conceptualisations of innovation of education held by various stakeholders in the field of education in Mauritius. The research questions are:

1. What are the conceptualisations of innovation in education held by various stakeholders in the education sector in Mauritius?
2. How do these conceptualisations influence innovation in different sectors in the education sector in Mauritius?

To this effect, the literature review presents the various conceptualisations of innovation in education. These conceptualisations range over a host of criteria such as categories, degrees, effects and scales of innovation. These constructs have been considered in the development of research instruments such as questionnaires and interview schedules to produce data from various stakeholders. The responses were analysed through the lenses of the literature, and the outcomes were remarkable in terms of sectoral (Primary, Secondary, and Higher Education) conceptualisations of innovation of education, overall conceptualisations of innovation in education and factors influencing innovation in education.

Literature review: Conceptualisations of innovation in education

This section has been purposefully named *conceptualisations* rather that *definitions* of innovation in education. The term definition was not deemed appropriate as it denotes a clear and specific explanation of the phenomenon under the research lens. A definition attempts to provide clarity, precision, and objectivity that would usually culminate in a shared understanding. Scholarship on innovation in education explicates the phenomenon as meaning and experience being deeply rooted within

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contexts (Wittgenstein, 1976) and cannot be solely determined by standardised, sanitised definitions. Indeed, as the following paragraphs expound, there are several meanings, characteristics and perspectives on innovation in education. The section starts with the importance of innovation in education and subsequently discusses several conceptualisations.

Innovation in education is indispensable for the growth of societies and to continually face upcoming challenges. It is believed that the quality of education imparted to citizens has a direct bearing on their life chances and standard of living (Serdyukov, 2017; Powdthavee, et al., 2015). Moreover, there is a constant pressure to innovate to solve issues posed by globalisation, climate change and technological progress, thus informing different conceptualisations of innovation in education (Vieluf et al., 2012; Cornali, 2012). Adding to the above, sociological pressure to deal with issues such as equity and the eradication of poverty are also driving the need for innovation to ensure quality education for all. Therefore, considering its importance, it is crucial for policymakers, higher education professionals and other key stakeholders in the field to have a broad understanding of what innovation is in education.

However, before considering *innovation* in *education*, it would be appropriate to delve into what innovation is. It would seem to be a very complex undertaking as innovation has been qualified as vague and multifaceted (Bar-El, 2023) and multidimensional (Edwards-Schachter, 2018). Indeed, there are 81 variables in the Global Innovation Index (GII) and 31 variables in the European Commission Summary Innovation Index (SII). This highlights the composite nature of innovation; there are multiple factors involved. To illustrate attempts to understand and promote innovation, there is even an emerging field called Innovation Studies in Higher Education (Fagerberg & Verspagen, 2009). Innovation Studies, located within social sciences, draw from areas such as cognitive and organisational factors that promote innovation.

It would also be useful to delineate innovation from other concepts such as creativity which refers to the process of thinking up something new while innovation is doing something new (Levitt, 1960). Therefore, the purpose of innovation is to make something differently as compared to what was being traditionally done, in terms of quantity and/or quality. To summarise the above argument, innovation would be conceptualised as the successful inception of a new thing or method (Brewer & Tierney, 2012). Departing from traditional ways of doing things requires inputs from what is labelled as the Triple Helix: government support, private sector engagement and contributions from academic institutions (Mercier-Laurent, 2011).

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In fact, academic institutions are crucial for both creativity and innovation to happen. Higher education institutions are essential in creating knowledge for new artefacts and methods to emerge (Perkmann et al., 2013). In particular, healthy links between industry and academic institutions through collaborative forms such as consultancies and access to research facilities are indications of an innovative set-up (Motohashi & Muramatsu, 2012; Jackson, 2018). However, it should be noted that some social actors lie beyond the ambit of the stakeholders described in the Triple Helix. Indeed, the civil society and other players also innovate in education (Kēpa & Manu'atu, 2011) and their contributions should also be taken into consideration.

Furthering this delineation process, some authors have distinguished between educational innovation and innovation in education (Mykhailyshyn, et al., 2018). Educational innovation refers to improvements in procedures or methods of educational activities that would increase efficiency. Educational innovations include pedagogical innovation that covers the style of teaching, integration of ICT and use of educational technologies. Improvement in teaching programmes also falls under educational innovations. Innovation in education is a wider concept. It encompasses things such as the implementation of a new learning strategy that departs from traditional ones and focuses on creation, not mere replication of knowledge. The focus of innovation in education is the realisation of human potentials, intellectual capabilities with the aim of enhancing creative thinking. These initiatives could be aiming at improving dispositions, autonomy of learners, assessment, collaboration and communication among educators or strategies to improve student engagement. Both educational innovations and innovations in education require the participation of multiple stakeholders such as students, parents, educators, the state and educational administration. Figure 1 illustrates the nuances between Innovation in Education and Educational Innovation.

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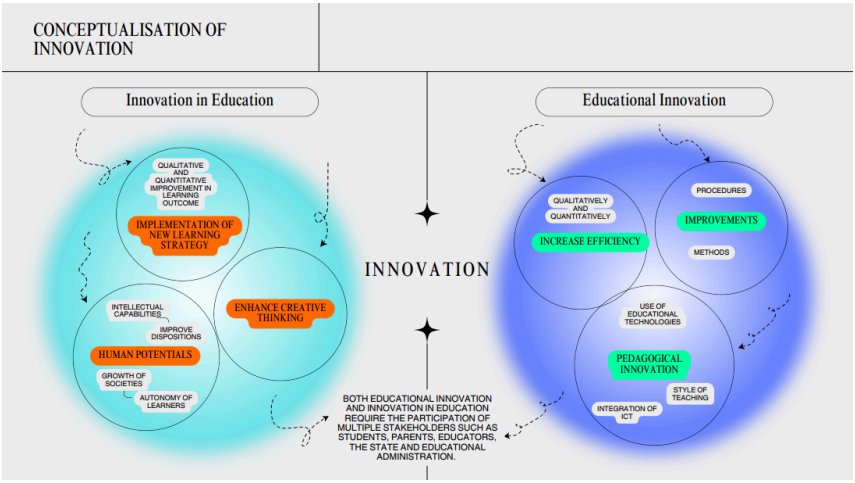
Figure 1: Innovation in Education vs Educational Innovation



Building on the introductory literature, an analysis of innovation can be called for in terms of the different categories, degrees, effects and scale of innovation. Innovation can be classified in three broad categories namely evolutionary and revolutionary, sustaining and disruptive, tangible and intangible. Evolutionary innovation would normally happen incrementally while revolutionary innovation would imply a complete overhaul of the old to be replaced by the new (Osolind, 2012). Sustaining categories usually focus on continuous improvement, contrasting with the radical nature of disruptive innovation. With disruptive initiatives, the whole field could change in a short lapse of time (Hang, et al., 2010). The last categorisation refers to tangible innovations that could be in the form of tools and devices, and intangible innovations represented by methods, strategies, techniques and new content.

Next to be considered is the degree of the impact of innovation. This classification includes two types of innovation, the small *i* (referring to small innovation) and the capital *I* (referring to significant innovation), and three levels. Level 1 and the small *i* refer to initiatives that could be described as adjustments or upgrading of a process within the education system. These initiatives may help stakeholders to perform their daily routines with more efficiency, but do not produce any new tool or method (Okpara, 2007). Level 2 is still within the ambit of the small *i*. However, Level 2

is a notch up as it describes modifications that are made to processes and methods with the aim of significantly improving performance. Some examples could be blended learning or a flipped classroom. Level 3 and the big areis about transformative enterprises that seek to dramatically alter the system. It refers to breakthroughs and a disruptive nature that could trigger systemic change. One example could be the impact of AI in education.

Basically, innovation in education aims at bringing a qualitative and quantitative improvement in learning outcomes. Qualitatively, education policy makers and other actors would like initiatives to generate better knowledge, skills and values (Benzies et al., 2024). Measures that boost motivation and foster positive learning attitudes are desired outcomes. Quantitative goals, on the other hand, focus on results, enhanced productivity in terms of learning more in the same time frame and cost efficiency, meaning less cost per student. Also, it is useful to consider the scale of the implementation of innovations. Scale refers to the size and location or geographical spread of an initiative. Location could be local or nationwide. Innovations could be a one-off singular event or occur multiple times. It can also be limited (to given sectors, for example) or total, encompassing all sectors. The origin of innovation has also been mentioned as either driven by the grassroots (bottom-up) or top-down, as most educational innovations are (Serdyukov, 2017). Innovations can also be homegrown or imported from another context. (Hervas-Olivier, et al., 2021)

Moreover, the literature also describes typologies of innovation. In this paper, the multilayered conceptualisations of innovation in education will be analysed drawing from the experiences of different stakeholders in the education sector. Some innovations are labelled as frugal innovation (Jayabalan & Dorasamy, 2024). It refers to making something with the means at one's disposal. This type of innovation is low-cost and can be contrasted with high-end, expensive innovations that might not be within the financial capabilities of developing contexts (Zhang, 2018). Frugal innovations are driven by the grassroots and sometimes go unnoticed. Or they may happen in contexts that are not accessible, such as the classroom. Teachers, for example, are involved in a lot of invisible, dark innovation (Martin, 2013). Teachers, as users of educational technologies and even scrap materials, engage in innovative activities that are invisible, hence the term invisible innovation (Miles & Green, 2008).

There are types of innovation that appear familiar. Technological innovations, for instance, an outcome of industrial change or a paradigm shift in science, can cause some

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sectors to completely overhaul or even be erased (Schumpeter, 1942). The promotion of technological innovations is reliant on proper set-ups such as government funding, private sector involvement and a vibrant research environment in higher education (Lam, 2006; Gault, 2018). Another common form of innovation is product innovation. Product innovation refers to a product that is new and/or significantly different from its predecessors (Gault, 2018). Product innovation is closely linked to process innovation as part of a product lifecycle. Process innovation is the development of new ways of doing things that are significantly more cost and/or time-effective. However, increasingly, user-driven innovations are taking centre stage. This has been described as the democratisation of innovation (Von Hippel, 2005) whereby the initiatives taken by users to shape the use of products are highlighted. For example, the use of computing to create other products, such as games and social media platforms implies that users are engaged in a creative and innovative process using computing devices.

Service innovation is another avatar that includes innovation in fields such as transport and logistics, healthcare, business and education. These innovations are sometimes intangible and respond to efforts made to satisfy customer needs (Goldstein et al., 2002). For example, the decreasing time to make deliveries or safer means to make payments could be strategic innovation goals of an organisation. In education, service innovation could facilitate access to learning. Another example illustrating the intangibility of innovation could be the elaboration of a new business model. In the same vein, solving societal issues has been a key driver of innovation. This is coined as social innovation. Social innovation involves changes in social practices. Examples could be voting rights for women or the implementation of waste recycling. All social innovation initiatives involve a collective process of learning and necessitate the participation of the whole community (Edwards-Schachter & Wallace, 2017). Figure 2 represents an overview of the conceptualisations of innovation in Education.

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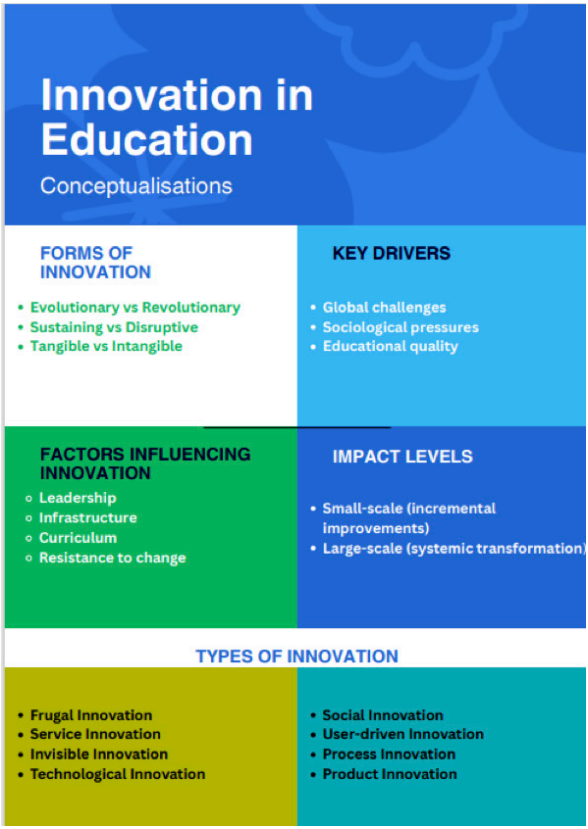
Figure 2: Conceptualisations of Innovation in Education



Ultimately, the categories, scale and different types of innovation are interconnected. For instance, social innovation is often the basis for technological innovation. As we have seen above, technological innovation is often reliant on process innovation. It would be appropriate to end this section by considering factors that promote innovation in education. The education sector is multifaceted and relies on multiple stakeholders and has interconnections with other sectors such as finance, environment and political systems. Therefore, innovation in education might also directly impact these other fields (Freeman & Thomas, 2005). Indeed, lack of finance or lack of political will might discourage innovations, and innovations in education could positively impact

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these above-mentioned sectors. Also, it has been contended that education systems are conservative and resistant to change, which is generally not the mindset required to innovate (Kerby et al., 2014). Leadership in educational organisations are also critical for fostering a climate for innovation. Leaders need to promote freedom of action, the emergence of ideas and a respectful and supportive environment. For instance, integration of ICT in teaching and learning is reliant on leadership at the school level (Polka & Kardash, 2013).

Even though a wide variety of innovations happen every day over different scales and locations, the yardstick for measuring successful innovations remains their diffusion. The diffusion of innovation (DOI) theory of Rogers (2003) identifies five factors that influence the adoption of innovations. They are the relative advantage in comparison to existing technologies, affinity with the organisation's ways of working and knowledge, complexity to implement, trialability and the possibility to observe the innovation being implemented. Rogers (2003) also explained who the potential adopters of innovations were: innovators themselves, early adopters, early majority, late majority and laggards. Rogers' (2003) study is still relevant today to help to understand why some innovations fail to be adopted by professionals or people in general (Abdelrehim, 2013). In a nutshell, Rogers (2003) argues that innovators must decrease the proportion of late majority, who are basically sceptical about the innovation and laggards who usually cling to traditions and base their decisions on what is usually done rather than what could be the new ways of doing things.

However, innovating in the education sector is not a straightforward process. The literature abounds of case studies that explain factors that promote and hinder innovation in education. For instance, Sumathi (2022) posits that the accessibility to technological advancements can be transformative and encourage teachers to adopt innovative teaching methods. Furthermore, it has also been contended that curricular reforms should lay the foundations for innovation in education. Indeed, strategic curricular orientations such as focus on 21st century skills can be the driving force promoting innovation in education. This can trigger more engaging approaches, where the learner is more a knowledge creator than a knowledge consumer. Innovative approaches are also adopted in teacher empowerment where the role of the educator is more of a facilitator rather than a coach (Jagtap, 2016). Adding to the above, Mupa (2015) argues that there is a need for leadership with vision creating an organisational culture whereby every person in the organisation thinks of new and innovative ways

of doing things. Indeed, how schools and educational institutions are led and managed could be a key element in promoting innovation in education. To summarize, some key areas of innovation in education are technology integration, innovation in teaching and learning practices, including a reform in the assessment practices. Innovative assessment practices may help to better attain the learning outcomes and also tailor instructions according to the students' preferences and needs (Falchikov & Thompson, 2008).

Leadership could be a determining factor in dealing with issues such as resistance to change. At times, institutions are so comfortable with a way of working that they show resistance to shifting from traditional beliefs and methods to innovative ones. Secondly, sometimes a lack of required infrastructure and funding can impact the adoption of innovation in education. Another factor is the curricular limitation, where the curriculum does not favour innovation. A rigid and linear curriculum does not leave space for innovative practices. Teachers lacking training or motivation can also result in not integrating innovation in their practices. What is important to understand is that innovation is not solely about adopting technologies, but rather a rethink of the pedagogy and curriculum (Helen et al., 2007).

There is a need to scale successful innovations and explore new areas of innovation in education that would help in addressing the needs and preferences of the learners. This study allows us to fill the gap in the literature by researching different conceptualisations of innovation in education and thus informs how these conceptualisations will help in the adoption of innovation in education. This review has provided a multi-pronged view of innovation and discussed them in the context of education where possible. The following section will outline the methodology employed to produce data from multiple stakeholders to develop multi-layered conceptualisations of innovation in education.

Methodology

Our ontological stance is pragmatism, as we view reality as something which can be interpreted in multiple ways depending on the context and purpose of the research. Epistemologically, this suggests that knowledge is both constructed and discovered. The aim of this paper was to develop, through mixed-methods research, a general way to explain what conceptualisations of innovation in education were held by

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different stakeholders in the field of education. Mixed-method research highlights the importance of considering multiple perspectives and values in the research process. This approach ensures that the research considers the impact on various stakeholders. The stakeholders come from various levels of the education sector, namely, Primary, Secondary, Higher Education and policy makers (hence the term "multilayered" in the title). The research design chosen for this study was mixed methods. The research was two-phased, comprising firstly engaging the stakeholders in responding to a questionnaire and secondly, a smaller sample of stakeholders was chosen for a Focus Group Discussion (FGD). The first phase of this study was establishing an informed knowledge about the diverse conceptualisations of innovation in education. The questionnaire provided us with statistical data on the diverse conceptualisations of innovation in education among the different stakeholders. Data for this first phase was collected through online questionnaires where the pre-determined questions aimed at gathering specific data on the conceptualisations of innovation in education. The aim of the second phase was to probe deeper into the phenomenon of the research. These tools and methods used, allowed us to garner data to answer the research questions. They allowed us to have better insights into the phenomenon "innovation in education".

The questionnaires provided data on what the conceptualisations of innovation in education are, while the FGDs guided us on how these conceptualisations influence innovation in various sectors in education in Mauritius.

Following the above research design, the sample of the study was constituted. It is not realistic to send questionnaires or conduct interviews with all persons in the population. To this effect, a non-random sampling technique was used. The convenient sampling technique was used to select the participants. The participants were easily accessible to the researchers. The researchers could make use of their extensive networks in the various levels of education. For practical purposes and due to time constraints, a convenient sampling was ideal (Bhardwaj, 2019).

These were the primary data. A sample of different stakeholders from Education was considered for this study: a sample of 30 primary educators, 20 secondary educators, 20 educational cadres from Higher Education and 8 Policy makers in Education. Online questionnaires were distributed among the participants from the primary, secondary and a tertiary sectors group of 6 participants was chosen for a Focus Group Interview.

In line with the idea of convenience, the questionnaire was administered online.

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Online questionnaires and surveys have taken much prominence during the COVID-19 pandemic. Administering questionnaires and surveys used to be a tedious affair with printing questionnaires, sending them and receiving them back by post. However, today with online tools such as MS Forms and Google Forms, questionnaires can be designed rapidly and dispatched at a click to respondents. Even one level of analysis possible with online tools (Ball, 2019). The software automatically generates statistical information that can be represented graphically. Online questionnaires were even found to be convenient to respondents (Nayak & Narayan, 2019). Furthermore, data can be downloaded in multiple formats, and errors pertaining to delivery and data entry are minimised (Callegaro et al., 2015).

While designing the online questionnaire, a survey design tool was used, and all the conventions of questionnaire design were respected. For instance, the respondents were given a clear explanation of why this survey was being conducted. The respondents were also provided with key ethical guidelines and assured that this research had received ethical clearance from the researchers' organisation. With an online questionnaire, researchers run the risk of overlooking important aspects of using this tool, namely, sampling issues (discussed in the paragraphs above) and question validation. Question validation cannot be discussed in isolation from ethical issues of informed consent. Some questions in the survey were mandatory, meaning that it was compulsory for the respondents to answer them. Their informed consent was sought, and it was done on a separate information sheet as recommended by Mahon (2014).

The second phase of the research required the use of FGD to further deepen the discussion on innovation in education with respondents. As mentioned above, a smaller sample of the original sample was chosen for this exercise. Online tools were explored to conduct FGD as early as 2001 (Ping & Chee, 2001). The purpose of conducting FGDs is to create an interaction among participants around the phenomenon under the research lens. The idea is to generate in-depth discussions on the topic, leveraging on the participants' experiences and opinions (Morgan, 1998). An FGD should also have an able moderator to ensure that discussions remain on-track and all participants have a fair chance to expose their views (Fontana & Frey, 2005). Care must also be taken that participants are respected and discussions remain civil despite possible disagreements.

Over the years, the development of digital tools and platforms has allowed the scheduling of online discussions for the purposes of research. In fact, the restrictions imposed by the COVID-19 pandemic have forced many researchers to adopt online

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tools for data production (Saarijärvi & Bratt, 2021). Even after sanitary restrictions were over, the use of video interviews through online platforms remained in use. One reason for this could be that this format is closest to the face-to-face interviews (Krouwel, et al., 2019). They even have the advantage of including people regardless of where they are located and over different time frames. To cater for technological issues that could crop up, it was ensured that participants were briefed on the procedure of the FGD and that their equipment was responsive to the video interview. This process of equipment verification is in lieu of the tasks that the researcher/interviewer had to perform to ensure an inclusive interview setting in a face-to-face context (Gibson, 2007).

Accordingly, a convenient date and time were agreed upon with the participants. This is an important factor to pay attention to (Beyea & Nicoll, 2000). The study was intended to investigate the multi-layered conceptualisation of innovation in education. Insights from educators/academics/policy makers in the field of education were important to us as researchers as they enabled a comparative analysis of the conceptualisations of innovation in education held by each stakeholder, as discussed in the research findings. The research informed how different stakeholders in the sector view what is and what is not innovation, what the limits and possibilities are to innovate and the facilitators and challenges to innovation in education. Semi-structured questions guided the FGDs, and they were the same for all participants. This ensured that the comparison was reliable.

Taking part in this research was entirely voluntary, and participants could withdraw from the research at any time. The interview was carried out on MS Teams. Everyone could join using a link generated by the software. The participants were briefed by the moderator before the start of the interview. They were told that their opinions mattered and that of others as well. Respect, despite disagreements, was essential for the good conduct of the session. They could also opt out of the interview if they wished. They were finally briefed about the length of the interview (they were notified in the consent forms as well). The participants would be able to view a recording of the interview. To ensure rigour in data production, the participants were asked to confirm the accuracy of the transcription (Morse et al., 2002). They were also told that it was not compulsory to turn their cameras on. This was deliberate on the part of the researcher as it was believed that non-verbal cues would act as a distractor and influence the discussions in an irrelevant direction. It was also a means to maintain some privacy (Saarijärvi & Bratt, 2021), though full confidentiality was not possible. The data generated from the questionnaires and interviews were anonymised by removing all identifying information

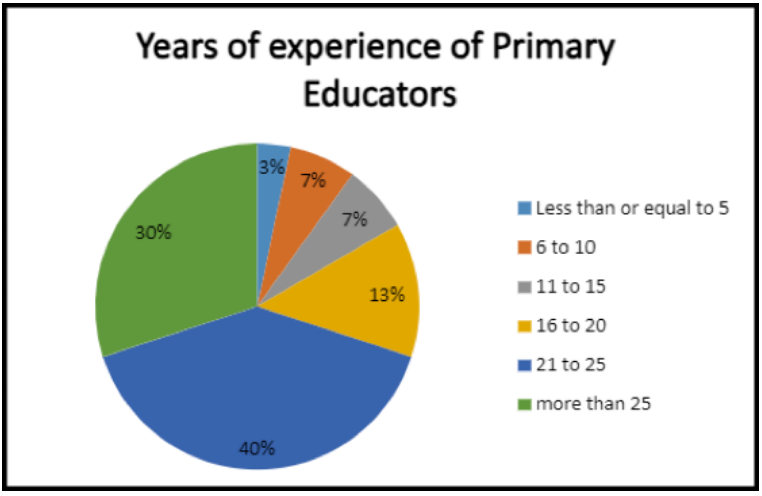
and treated confidentially using a coding system. Only the researchers and persons holding an official and ethically bound role at the MIE in the context of this research had access to the anonymised transcripts. Anonymous extracts may be quoted in any publications made on this project, such as conference papers and scholarly publications. The consent forms and original recordings will be kept within the research team and retained at MIE.

Result and Discussion: sectoral conceptualisations of innovation of education

Primary Education Sector

The response rate was 100% as all the 30 primary educators responded to the questionnaire. Most of the Primary School Educators that responded to the questionnaire had a substantial amount of experience, as shown in Figure 3. Seventy per cent of them had over 20 years of teaching experience. Hence, they have seen the implementation of several ICT projects such as Tablets for learners (the Early Digital Learning Programme since 2017) and Interactive Projectors in classrooms (the Sankoré project, 2011-2015).

Figure 3: Years of experience of Primary Educators



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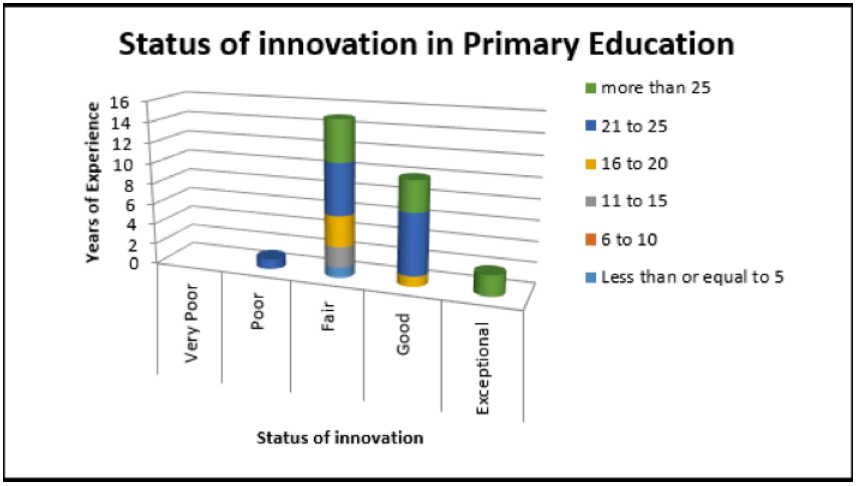
Their experiences influenced their conceptualisations of innovation in education. As indicated in Figure 4, only 1 respondent described the status of innovation in primary education as poor. It can be extrapolated that due to these abovementioned projects, they had an overwhelmingly positive outlook on the status of innovation in their education sector.

Figure 4: Status of innovation in Primary Education



The Primary Educators were the only respondent group to describe innovation in their sector as exceptional, citing the provision of equipment (projectors, tablets and digital learning resources) to all students and educators. The mere presence of these technological innovations in the sector prompted them to believe that innovation was being studied. Respondents suggested that learners' and teachers' perspectives were taken into consideration while referring to the design of digital learning solutions that are uploaded on the tablets. However, in some subject areas, such as Asian Languages and Arabic, educators complained that they had restricted access to digital tools. Generally speaking, educators recognised that there was a marked difference between classrooms of the past and now. It is noteworthy that Primary Educators were almost exclusively focused on tangible innovation. Nevertheless, the picture is not entirely rosy. Educators mentioned that they did not have enough support to troubleshoot equipment. Therefore,

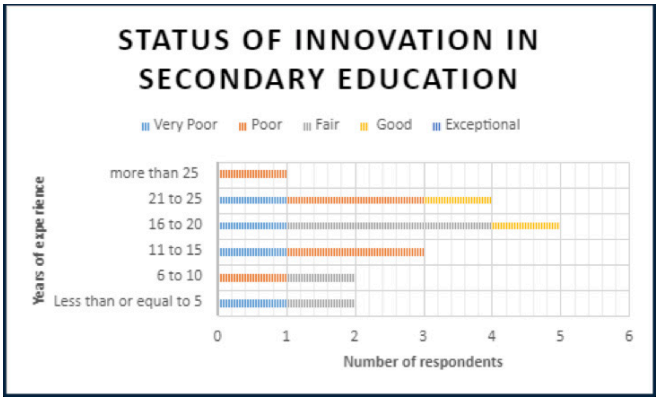
this resonates with the fact that a technological innovation needs to be followed up by a service innovation as well. Notably, few of them pointed out that the distribution of equipment was not supported or followed by a change in teaching methods.

Secondary Education Sector

The Secondary Educators were less optimistic about innovation in their sector. Over half of them (56%) felt that the status of innovation in Secondary Education was either poor or very poor (see Figure 5). None of the respondents chose "exceptional" and only 2 chose "good". These 2 outlying responses focused on the availability of technological tools and the possibility to combine these with new teaching and learning methods. However, it was difficult to ignore the primarily critical outlook of the Secondary Educators. They highlighted that there was "nothing" in their sector (no projects as compared to Primary Education). They also highlighted missing intangible and qualitative aspects of innovation in education by mentioning that teaching methods have barely changed over the years. The educators mentioned that some progress has been made in terms of using ICT for educational administration purposes. However, they underlined that this had little impact on pedagogies and were "cosmetic" changes at best.

Remarkably, one educator mentioned that research done in the local context on innovative practices is not implemented. Overall, an overwhelming majority in the respondent group (17 out of 18) did not believe that innovation in the secondary education sector was being studied/researched.

Figure 5: Status of innovation in secondary education



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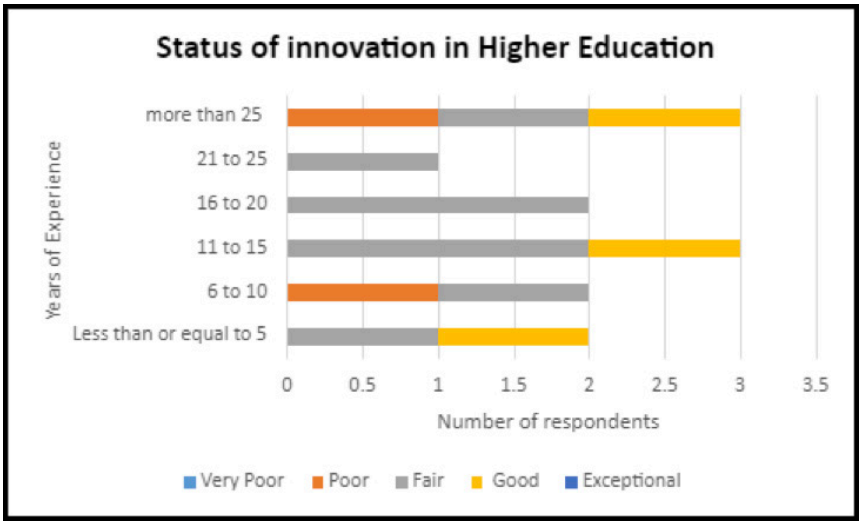
Higher Education

Higher Education respondents who positively appraised innovation in their sector were also tool-centric and focused on digital technologies, citing hybridisation of learning and educational technology. Superficial mention was made of innovative teaching strategies. The academics who had a more mitigated view on innovation in higher education warned that innovation must be equated with the introduction of digital technologies and tools only. Availability of funds was also repeatedly mentioned as a significant blocker for innovation to happen. Academics also underlined that all stakeholders must be involved when innovative projects are undertaken. Those who believed the status of innovation in Higher Education was poor did not substantiate their claim. Figure 6 serves as illustration.

Figure 6: Status of innovation in Higher Education

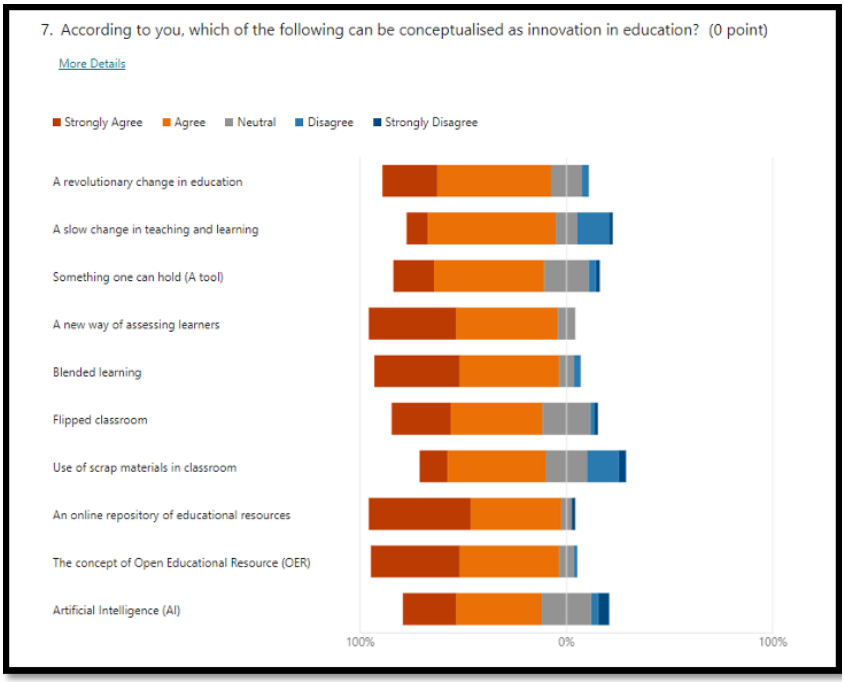


Moreover, 62% of the respondents from Higher Education were either not aware whether innovation was being studied in their sector or did not believe that it was being done at all. Those who thought that research initiatives were directed towards innovative practices tended to equate research to research proposals and studies on classroom practices and adapted teaching and assistive technologies.

Overall conceptualisations of innovation in education

Sectoral conceptualisations of innovation in education show that respondents were influenced by the volume of investment and projects initiated and implemented in their sector. The next sets of responses give more insights into educators' appreciation of what innovation is in education. Figure 7 explains.

Figure 7: Conceptualisations of innovation in education



The revolutionary vs evolutionary continuum (Osolind, 2012) was suggested to the respondents. Most of the respondents agreed or strongly agreed that innovation in education can be both revolutionary and evolutionary. However, there was some disagreement/neutrality (28%) with regard to evolutionary innovation. The next questions dealt with tangible/intangible innovation. There was more inclination to liken new methods as innovative. There was some disagreement/neutrality (27.8%) about considering tools as innovative. Moreover, this was possibly confirmed by the next set of

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data as the respondents strongly agreed/agreed to consider Blended Learning (87.7%) and Flipped Classroom (73.2%) as innovative practices. The same can be said for the OER concept. However, 39% were either neutral or disagreed with including the use of scrap materials to innovate. Therefore, it can be said that frugal innovation is not yet ingrained in the minds of educators. They are more liable to consider high-end product innovation, such as the introduction of tablets in teaching and learning. AI as a concept was also met with some scepticism, as indicated by the high level of neutrality (24.1%). Possibly, AI being a recent development, educators are in a wait-and-see mode.

Factors influencing innovation in education

The next data set rendered some rather unexpected results (as shown in Figure 8). For instance, funding was not considered a stimulating factor for innovation by 15% of the audience. Though Mauritius is quite vulnerable to climate change, it was not considered to engender innovation. The data confronts the triple helix belief that government, academia and industry should collaborate to foster a climate of innovation, with 31.7% stating that industry involvement has a moderate impact and 10% qualifying the impact as low. This could indicate that the industry is kept separate from the education realm. Another notable data point was the consideration given to *macro* and *meso* factors that focused on the education sector. *Macro* factors such as Teacher Education and Curriculum Design (both at 41%) were deemed to have a very stimulating effect on innovation in education. Therefore, not only were trained teachers believed to be important in the eyes of the respondents, but a well-designed curriculum is also considered to be a catalyst for innovation in education. This suggests that human resources must be empowered to make use of innovative approaches proposed by institutions, resonating with Rogers' (2003) claim that the workforce must develop affinity with the organisation's ways of working and knowledge.

Interestingly, policy elements such as Political Will were considered to have a very high bearing on the innovation climate (43.3%). Education research received similar levels of approval (50%). It was noted that a large chunk of the respondents was doubtful about innovation being driven by foreign forces. Indeed, 31.7% of respondents thought that support from foreign countries and organisations had a moderate impact on innovation.

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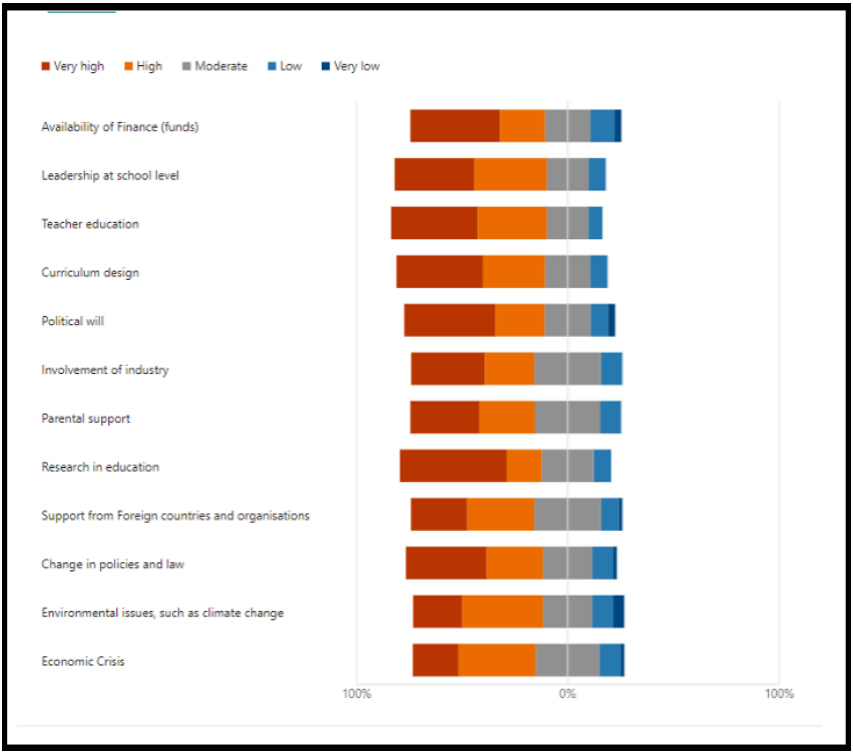
Figure 8: Potential to stimulate innovation in education



Meso factors such as Parental Support and Leadership at the school level received high approval ratings regarding their capacities to stimulate innovation. Parental support was discussed in the FGD.

The FGD exercise was carried out with three academics, one participant from the industry and one participant working in policy making in the education sector. They focused, amongst other things, on the resistance of the education sector to change by highlighting the fact that the Education system in Mauritius is still very conservative at its base and would stay in a comfort zone, relying on methods that have been used in the past. Moreover, this mindset was deemed to be problematic for the country as one participant stressed the fact that if teachers continue to use traditional methods, learners from this generation will be "cut off" from learning. All participants agreed that the

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world had changed a lot and felt that education had not followed the pace of change and trends as they would wish. They also discussed the fact that there is much focus on tangible innovations and less on intangible innovations of pedagogical nature, and encouraging capacities to reflect and think critically. For instance, the respondents highly rated innovations in teacher education, research in education and curriculum design (figure 8). This can be contrasted with the views expressed by the educators regarding tool-centric additions to the teaching and learning environment. However, for all the respondents, innovation requires the development of the 21st century skills, including critical thinking, communication, collaboration, creativity and lifelong learning. So, an intersection between tangible and intangible innovation could be identified from the data obtained.

Adding to the above, they pointed out that there is an urgent need to train educators to embrace these technologies. The technology with the adapted pedagogical approach will have to be incorporated into our education system. It was deemed essential to motivate champion educators as per the initiatives taken by industry people to promote innovation in education. However, champions need to have a supportive environment to be able to sustain innovation over time. Indeed, it appears that innovation is a one-off event that occurs during extra-curricular activities. On the brighter side, these events embraced frugal innovation as indicated by the findings; scrap materials and OERs point to low-cost solutions for innovation (Figure 7). Moreover, the policymaker believed that pressure from out-of-school stakeholders, such as parents and media, discourages educators from innovating, redirecting their focus towards *producing results*. This observation was shared and confirmed by the academics, who stated that educators do have the knowledge to be able to innovate in the classroom. It is either that their innovations go unnoticed (invisible innovation) or that they are constrained to use traditional methods because of a host of factors such as pressure to complete the syllabus, examinations and expectations from parents and students.

The analysis points to a recurring fusion of innovation with technological adoption. Innovation is often narrowly viewed as the integration of ICT or digital tools, while pedagogical and process-related innovations are underexplored or overlooked. Indeed, this was confirmed by the data obtained from interactions with educators who often linked innovation with the availability of technological tools in the classroom. This is evidenced by the data from Primary and Secondary Educators. Furthermore, Higher Education's respondents identified a lack of funds that discourages innovation in

education. This could indicate a lack of focus on frugal innovation, where funds are not of paramount importance. Therefore, the data points to conceptual gaps in the respondents' understanding of innovation in education. More worryingly, there was no evidence of any cross-sectoral collaboration to promote innovation in education.

Lastly, the data points to a lack of decisive actions from leaders in the education sector as the system and beliefs are left unchallenged. Conservatism in educational institutions and reliance on traditional methods impede innovation. Educators, hence, face systemic and cultural resistance to adopting new practices, compounded by pressure to meet examination and syllabus completion demands.

Conclusion

From the discussion above, what comes to light is that all share the innovative mindset. However, there is a disconnect between education stakeholders and what parents and the media want. There needs to be a shared understanding of what innovation in education means and why it is important for the future of the country. Indeed, it makes no sense to demand capacity building to face 21st-century challenges and better life chances while at the same time denying educators space, time and funds to innovate. As mentioned by Vieluf et al (2012) and Cornali (2012), there is an urgent need to find solutions to pressing issues of climate change, technological acceleration and rampant globalisation. We cannot afford not to innovate, especially in education. An education system that is unresponsive to these (and many others) can have dire consequences for a society (Diamond 2005).

As researchers, we would recommend that innovation be taught as a subject. It would help to instil the proper mindset in students. By integrating innovation into the curriculum, educators can equip students with the tools and skills they need to navigate and shape the future effectively. It could be in the form of a body of knowledge known as innovation studies that would encourage both teachers and students to move boundaries and go beyond the curriculum. It is desirable that the subject is infused in a transdisciplinary manner with the school curriculum. Moreover, the triple helix of Government, Private Sector and Education should be strengthened to foster setups and initiatives that are conducive to innovation. From the data, the role of policymakers is seen as important and spoken of by the respondents. They were, however, quiet as far as the role of the industry is concerned during the interviews. This silence of all three sets of

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respondents tells a lot about how they conceptualise the role of the industry. Therefore, there is room for more industry involvement to stimulate innovation in education from many angles, such as financial help, sustainable and more productive industrial solutions.

Possibly, the triple helix must evolve into a quadruple helix model to include media so that innovative enterprises are brought into the limelight and receive due consideration. It is vital to raise public awareness to encourage and support innovators.

Innovation in education requires a delicate balance between adopting new technologies and reimagining pedagogical practices. While supportive curricula, technological integration, and empowered teachers drive innovation, resistance to change, resource limitations and rigid traditional systems act as significant barriers. Addressing these challenges holistically is essential for fostering an innovative and adaptive educational environment, taking into consideration the fact that most of the literature comes from the Global North. There are no equivalent studies, no indigenous conceptualisations of innovation in education as far as Africa is concerned. Therefore, as we continue to use Global North yardsticks, African innovations in education will continue to go under the radar.

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