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### Envisioning an effective education system for Generation Alpha focused on skills development in the fashion design higher education sector

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#### Abstract

The design higher education system of today will not be applicable to the demands and requirements of tomorrow (Munir & Nudin 2021). Furthermore, Generation Alpha introduces a new challenge to our current education systems, demanding a new approach to education. Accordingly, Karen Gross, the author of *Breakaway learners*, believes that universities should begin adapting to cater to Generation Alpha, suggesting that thinking ahead is crucial in planning and contemplating the future's implications (Hall 2017). The research study sets out to identify trends through the review of the literature that the current design education system is outdated for the next cohort in higher design education called Generation Alpha. Additionally, the research study predicts an effective approach to educating Generation Alpha in the fashion design higher education sector as potential students and graduates by using secondary research of literature studies globally. This study aimed to contribute to this growing area of research by exploring the most effective education systems for Generation Alpha in the fashion design higher education sector through analysis of Gen Alpha characteristics and anticipated future skills required in the fashion design sector. After reviewing literature focusing on the unique characteristics of Generation Alpha and the anticipated future skills required in the fashion design sector, the Kano Model was utilised to highlight Generation Alpha's expectations and needs in shaping the future of education. Firstly, the study identified the unique characteristics of Generation Alpha, such as their strong connection with technology and their need for digital literacy. Accordingly, the findings from the literature review suggest that the fashion design industry is becoming more technology-driven, requiring CAD and robotics skills, amongst other technologies. Consequently, the fashion design higher education system for Generation Alpha should involve digital literacy, robotics, AI, big data analysis, and other STEM-related skills to meet their needs based on Generation Alpha characteristics and prepare them for future fashion design careers.

**Keywords:** Design education, fashion design, future education, Generation Alpha, Kano Model, technology.

#### Introduction

We're preparing a generation for a world we cannot imagine, and jobs that don't currently exist (Goyal 2020).

The above quote suggests that envisioning the skills for future generations will be strenuous due to the unknown demands and changes of the future world of work. The future of the higher education sector is uncertain, and the skills acquired from higher education should go beyond preparing the student for the existing career opportunities in the design industry (Munir & Nudin 2021, p. 144). In order to prepare for the future of education, it is also important to consider the future student; specifically, Generation Alpha. This generation introduces a new challenge to our current education systems. They are widely defined as the population born from 2010 until 2024 (Munir & Nudin 2021, p. 138; Ziatdinov & Cilliers 2021, p. 23). Education approaches need to be developed to fit the characteristics of the generation and suit the zeitgeist of the era (Munir & Nudin 2021, p. 144). The upcoming generation of students entering higher education will have distinct skills and needs (Ziatdinov & Cilliers 2021, p. 22), requiring educators to adopt innovative teaching methods to cater to their requirements and enhance their learning experience in the design sector.

Recent research indicates that the traditional model is ill equipped to tackle the challenges presented by the 21st-century digital, global economy (Halabieh, Haya & Hawkins, Sasha & Bernstein, Alexandra & Lewkowict, Sarah & Kamel, Bukle & Fleming, Lindsay & Levitin 2022, p. 13). Research findings have identified existing shortcomings within our contemporary education system, such as outdated pedagogical approaches and a lack of career-relevant skills (Halabieh, Haya & Hawkins, Sasha & Bernstein, Alexandra & Lewkowict, Sarah & Kamel, Bukle & Fleming, Lindsay & Levitin 2022, p. 13). According to Sampoerna et al. (2020) and Wahyuddin et al. (2022) the existing research on how Generation Alpha learns is limited to the elementary education field due to the young age of the oldest members. Current reports on the future of education as seen in the Education 2030 report by OECD (OECD, p. 2018) and the UNESCO report 'The Futures of Education for Participation in 2050: Educating for Managing Uncertainty and Ambiguity' (Haste & Chopra 2020) exclude Generation Alpha and lack conclusive evidence on how they will be integrated into predicted trends.

Few studies have investigated the association between the future of work and preparing students in higher education for these careers (Goyal 2020; Jukes, McCain & Crockett 2010). Research indicates that the current educational system fails to prepare students for future careers that do not yet exist. This is supported by Kasriel (2018), who states that the future of work will require a skill-focused approach rather than a degree-focused one.

Within the context of the design industry, there is a scarcity of studies that address skills development in higher education (Dutta 2020; Starling & Steen 2019). The perception of skills' value in the design industry varies among students, professionals, and faculty members, highlighting the need for alignment between education and industry expectations (Starling & Steen 2019). The evolving nature of the design sector necessitates a close examination of how fashion design education can equip Generation Alpha students with the adaptable skills required for the uncertain future landscape.

The purpose of the study is twofold. Firstly, investigate the implications of technological trends in the field of fashion design for the future of the fashion design education field, with a specific focus on understanding the significance of these technological trends in shaping educational approaches and methodologies. Lastly, identify the key technological competencies that will be imperative for Generation Alpha fashion designers, exploring the specific technologies and digital literacies aligned with the needs of the emerging cohort to thrive in the evolving landscape of fashion design.

## Research questions

This study analyses the needs of Generation Alpha and envisions the necessary skills by reviewing existing literature on their characteristics, trends, and technological advancements. It aims to gain insights into the future of fashion design education and identify essential skills for future designers.

1. Given our current understanding, how could the landscape of design education evolve in the future?
2. How does the significance of present-day trends translate into the forthcoming landscape of design education?
3. Which technological proficiencies will be essential for Generation Alpha designers to possess?

## Literature review

### Generation Alpha defined

Generation Alpha is the population that is born between the years 2010 and 2024 (Zmuda et al. 2017). Interestingly, the birth year 2010 coincides with the launch of the iPad and Instagram (Jha 2020, p. 2). It comes as no surprise that Generation Alpha is the most technologically literate in human history, which results in the group having specific and distinct needs (Zmuda et al. 2017). Accordingly, they are the first generation that is living in a digital environment from birth (Danilova 2023, p. 59). Also referred to as 'digital natives' have unique characteristics such as 1) creativity, 2) dynamism, 3) leadership, 4) growing and interacting with a variety of technologies, and 5) dealing with digital literacy (dos Reis 2018, p. 17; Munir & Nudin 2021, p. 139). Generation Alpha will soon fill classrooms in universities and require unique approaches to teaching and learning based on their unique characteristics (Ziatdinov & Cilliers 2022, p. 22). This enhances the importance for educators to prepare for the next generation of students who will enter the higher education sector based on their unique characteristics. Mannheim (cited in Jha 2020, p. 5) states that Generation Alpha has been influenced by various events, including the global financial crisis recovery in 2008, digital technologies, social media, changes in family structures and the ongoing COVID-19 pandemic. Furthermore, the vulnerabilities emerging from digital technologies include cognition (Wilmer et al. 2017), sleep (Jha et al. 2019), and lower emotional well-being in comparison to previous generations (Augner & Hacker 2012).

### Anticipated future skills in the design industry

Due to the emerging technologies, students are required to develop and enhance STEM (science, technology, engineering, and mathematics) skills. These skills will include coding and building robots (Darmawansah 2023). It is suggested that STEM skills for students will replace the current academic writing and language skills. Previous studies have reported that STEM education has emerged as a prominent educational initiative (Reiss & Holmen 2007; Sanders 2009), representing a field of study that connects science, technology, engineering, and mathematics in an interdisciplinary manner. Other skills that will be important for the future of education [2050] include 3D printing, virtual environments, virtual blockchains, and virtual digital applications (Solis 2022). This means that school curriculums will become more decentralised due to technological changes (Hillman, Rensfeldt & Ivarsson 2020).

McCrinkle and Fell (2020) state that Generation Alpha students should be introduced to the skills of robotics, social media marketing, app development, and big data analyses to equip them for the Fourth Industrial Revolution (Industry 4.0) for careers that do not exist yet. The utilisation of valuable

insights derived from big data as a skill has the potential to enhance learning, teaching, and administrative processes (Daniel 2015). As a result, the exploration of big data and artificial intelligence (AI) in the field of education is becoming increasingly important for the future student (Becker et al. 2017). One of the most important skills identified for the future student is robotics (Barak & Zadok 2009; Han & Kim 2009; Alimisis 2013; Mndende 2022). Studies have proven that incorporating robotics into education has a beneficial effect on student behaviour in particular areas, such as problem-solving abilities (Barak & Zadok 2009), collaboration (Hong et al. 2011), motivation to learn (Kubilinskienė et al. 2017), active participation (Rusk et al. 2008) and class engagement (Han & Kim 2009; Alimisis 2013). Interestingly, the Department of Basic Education (DBE) in South Africa has included robotics and coding in the curriculum for younger grades in 2023 and aims to introduce these subjects to Grade 9 students by 2025 (Mndende 2022). There is already evidence of the incorporation of robotics in a few universities, such as Manchester Metropolitan University, which is in the process of establishing a research facility called the Robotics Living Lab (ROLL), which aims to support micro-scale fashion businesses by using robotic technologies to promote sustainable production methods (Abdulla 2023; Bithell 2023). For the design sector specifically, an important skill highlighted is computer-aided design (CAD) software, which requires design software skills as it is essential for fashion designers to complete fashion-related projects, which is vital within the contemporary fashion industry (Kiron 2023). Robotics as a skill is already seen within the fashion design sector: SewBot from SoftWear (Newton 2022), Zornow's Sewbo (Kavilanz 2016), and LOWRY Sewbots (Barman 2021). However, most fashion design institutions in South Africa still teach the traditional methods of garment construction.

As mentioned in the previous section, Generation Alpha has a strong connection with technology (dos Reis 2018, p. 11). Digital up-skilling must be integrated into the higher education approach to developing a digitally literate workforce needed for the future. The education sector plays a vital role in developing these advanced skills by incorporating Industry 4.0 technologies, as mentioned above. Industry 4.0 education design includes skill-based education and digitised learning (Munir & Nudin 2021, p. 141). In order to fully benefit from digitalisation, we must strengthen the innovation culture in education. This requires the right institutional and regulatory approaches (OECD 2022, p. 9). In the present day, academic institutions are already accepting the need for better integration of technology into education (Ziatdinov & Cilliers 2022, p: 6). But Blessinger et al. (2022) argue that most higher education institutions have not made the shift to cater for Industry 4.0.

### The current design of higher education systems

The difficulties with the current educational system investigated raised in this study are threefold: [1] Firstly, research suggests that the future of work will require a skill-focused approach rather than a knowledge/degree approach (Kasriel 2018). [2] Secondly, published reports on the future of education: HolonIQ's report on Education in 2030 and the UNESCO report, 'The futures of education for participation in 2050: educating for managing uncertainty and ambiguity' omits information on Generation Alpha: entering higher education in 2028. [3] Lastly, studies are reporting on the outdated educational system and the irrelevance of universities in the future of education (Mouton, Louw & Strydom 2012; Llopis 2022). Technology allows education to become more flexible and accessible, breaking down geographical and time-related barriers, and it can redefine the way educational institutions are structured, with a reduced emphasis on physical infrastructure in favour of digital and online learning platforms (Blessinger, Singh, Poobalan & Nauman 2022).

Soni (2021) discusses the evaluation of current education systems by the World Economic Forum (WEF) and highlights that 60% of future jobs have not yet been developed, underlining the rapidly

evolving nature of the job market and 40% of nursery-age children in schools today (Generation Alpha) may need to pursue self-employment to generate income in the future, indicating a shift in the nature of work (Soni 2021). The research findings indicate that the global transition into the Fourth Industrial Revolution, marked by substantial technological progress, may pose challenges to existing education systems in adequately equipping individuals for the continuously evolving job market (Soni 2021). This scenario gives rise to concerns regarding the effectiveness of education in meeting the future workforce's requirements and challenges (Soni 2021). Universities should incorporate soft skills used in modern work to equip students for their careers. Hansen (2021) has reported that educational systems are not held accountable for equipping students with the required skills to prepare for careers and workplace readiness, while employers mostly rely on traditional degrees as the main requirements for determining whether the candidate is suitable for the position. Hansen (2021) has concluded that there is a high rate of underemployed or unemployed individuals, which is a direct result of the disconnect between the education system and employers. Zmuda et al. (2017) revealed that the current educational system focuses on the needs of Generation Z while using the generation's resources and sharing baby boomers' content. The learning of the different generation groups are as follows: Baby boomers 'learning was structured and formal, Generation X engaged with a relaxed and interactive learning process, Millennials 'learning the inclusion of multisensory and multimodal technologies and Generation Z engaged with learner-centred approaches (Zmuda et al. 2017). Modifications are necessary for the higher education system to accommodate Generation Alpha, considering their unique learning approaches shaped by cultural norms and traditions (Jha 2020; McCrindle 2008).

#### **Generation Alpha education systems**

Private tech companies are actively introducing innovative approaches to education by incorporating technologies like augmented reality to create interactive learning experiences (Goyal 2020). These companies are gamifying education and developing digital play and learning platforms, aiming to enhance the educational paradigm (Goyal 2020). It has been suggested that future assessments will include AI-driven diagnostic assessments to measure student success, where students will not achieve letter grades that indicate failure or pass (Solis 2022). This study emphasises the resemblance between the workplace and the promotion process, where individuals progress to higher managerial positions based on meeting specific requirements or tasks (quality of work) rather than receiving a grade for task completion. Solis (2022) suggests that teachers will no longer be required to physically present a classroom due to the online nature of classes where students can connect online. This will allow for job opportunities, such as virtual teachers, since the classroom will include virtual and robotic teachers and education assistants (Solis 2022).

#### **Opportunities: Generation Alpha education systems**

The one-size-fits-all education approach will not be viable to Generation Alpha, as they are accustomed to personalisation and will require it in their educational framework as they are used to technologies that immediately respond to their needs (Hosid 2021). Zmuda et al. (2017) and Hughes (2020) have reported that classroom experiences should shift focus from content mastery to meaningful skills-based experiences, allowing Generation Alpha to innovate and share their knowledge effectively. Research by Ziatdinov and Cilliers (2021, p. 7) refers to opportunities for teaching, as cited by Nagy and Kölcsey (2017) that includes social media as a teaching tool and that classroom engagement should develop knowledge over accessing existing knowledge (Ziatdinov & Cilliers 2021, p. 7). Social media is a tool that Generation Alpha is comfortable with and should be incorporated as part of the learning process (Dani 2023). Teachers can use social media in the

classroom to share study materials, opinions, and projects by commenting on posts, sharing links to other websites, building peer networks, and enhancing the online learning experiences that will result in a culture of collaboration and sharing that leads to an improved learning experience (Dani 2023).

### Challenges Generation Alpha education systems

Ziatdinov and Cilliers (2021, p. 6) assert that academic institutions are already aware that technology needs to be incorporated into the education system, which will influence the way that future students learn (Glenn 2008). An important note is that Ziatdinov and Cilliers's research (2021, p. 6) was not conducted in Africa, as the most significant problem with emerging technologies within the educational sector is load shedding. Most research provided on the future of education includes the usage of technology. However, to the researcher's knowledge, no current research studies are being conducted taking the consideration of load shedding into account within the South African context of higher education. South African Democratic Teachers' Union (Sadtu) spokesperson Nomusa Cembu, as cited by News 24 (McCain 2022), stated that load shedding is disrupting teaching and learning and the current shift towards a digital era in schools is placed on hold, suggesting that the implementation of technology into the educational sector within South Africa is more difficult.

## Discussion

Several studies in the field of education have employed the Kano Model as a theoretical framework, treating students as clients of the educational institution, as observed in the research of Venkateswarlu, Malaviya, and Vinay (2020), Kuo, Chang, and Lai (2011), and Madzík, Budaj, Mikuláš, and Zimon (2019). The Kano Model employs a 2D, non-linear approach to evaluate user satisfaction by analysing product quality attributes, enabling an assessment of whether specific features are perceived as delightful or displeasing by customers (Venkateswarlu, Malaviya & Vinay 2020). Customer satisfaction is contingent on the service's performance relative to customer expectations (Parasuraman, Zeithami & Berry 1997). The research focuses on characterising the needs of Generation Alpha to anticipate the technological trends (services) they will expect as part of their fashion design education when entering higher education. De Shields et al. (2005) underscored the influence of courses aligning with real-world trends, live projects, and practical cases on fostering a positive college experience for students (Deshields, Kara, and Kaynak 2005). Adapting the Kano Model to education underscores the shift toward student-centred learning, which is an important factor to consider when teaching Generation Alpha (Arifah, Munir & Nudin 2021). Research suggests that future educational initiatives should employ a student-centred approach, primarily aimed at addressing the resurgence of Industry 4.0 within Generation Alpha (Arifah, Munir & Nudin 2021).

The Kano Model highlights the significance of students' expectations and needs in shaping the future of education, considering education as a service provided by universities to Generation Alpha students, who are seen as the primary customers, in order to ensure that education evolves and fulfils the needs and desires of students. As a result, students are viewed as customers of this educational service (Sherry 2021). In this perspective, universities are seen as service providers responsible for delivering educational programmes and facilitating learning experiences that meet the needs of the future Generation Alpha student as the customer. This model categorises features into five distinct groups: basic, performance, delight, and needs. These categories enable researchers to prioritise the anticipated fashion design skills based on the insights derived from the literature review, allowing the researcher to recognise and predict the unique needs foreseen for Generation Alpha in fashion design education to help educators tailor the curriculum to meet the specific needs of this generation and ensure a relevant and impactful education.

**Table 1: Kano Model showcasing types of needs of Generation Alpha in design in higher education**

basic needs (expected features):	Performance needs (Satisfiers):	Excitement needs (Delighters):	Indifferent needs:	Reverse needs (Unspoken needs):
Accreditation basic curriculum qualified Instructors skills-based experiences (Zmuda et al. 2017; Hughes 2020). digital literacy: Basic computer skills, internet skills (Hansen 2021).	Advanced curriculum, practical experience, education system – focus on skills-based experiences (Zmuda et al. 2017; Hughes 2020). Facilities and resources: computer numerical control (CNC) carving (Stanchieri 2022; Yasar & Essex 2023). CAD software: Adobe Illustrator, CLO3D, and Optitex.	Cutting-edge technology: Advanced AI and machine learning, quantum computing (Frąckiewicz 2023). CAD software (Kiron 2021), 3D printing, digital sketching, digital sketching: tools like Microsoft Surface Studio or Wacom tablets. 3D printing (Hye-Won & Tracy 2014).	Extensive non-core courses: various disciplines (human body engineering, medicine, chemical technology, nanotechnology, biotechnology, optics) (Qiu & Hu 2014).	Online classes: Education 4.0 makes use of Industry 4.0 technologies and active methodologies Silva et al. (2020). Examples of these methodologies (Moraes et al. 2023): hybrid learning online and offline, with distance activities, discussion groups, etc. project or problem-based learning and flipped classroom approach.

By applying the Kano Model, educators and institutions offering fashion design programmes can better understand what features and experiences will have the most impact on student satisfaction and success. It can help prioritise educational strategies, curriculum development, and resource allocation to produce well-rounded, skilled graduates ready to enter the fashion industry.

## Conclusion

Insights from the literature review shed light on factors that are poised to shape the future of design education. Firstly, there will be a pronounced shift towards student-centred learning models that focus on skills development over content mastery, fostering experiential learning and reflection as alternatives to conventional grading. Secondly, the integration of emerging technologies, such as robotics, augmented reality, AI, and 3D printing, will become paramount in design education, necessitating STEM skills like coding and robotics for students to thrive in the industry. Furthermore, the educational landscape will witness a shift towards flexible learning models, including online and hybrid approaches, to cater to Generation Alpha's diverse learning preferences. These transformative trends collectively predict a dynamic and adaptable future for fashion design education, aligning it with the needs and expectations of Generation Alpha and the evolving fashion industry.

Present-day trends indicate a strong shift towards technology-driven, student-centred, and skills-oriented education. These trends align with the needs and characteristics of Generation Alpha and are expected to shape the future landscape of design education. Firstly, there will be a continued escalation in the integration of technology, with a specific focus on cutting-edge innovations such as AI, 3D printing, and robotics. These technological advancements will assume a central role in design education, stimulating creativity and fostering innovation. Secondly, the educational landscape will have a more flexible learning environment, with an emphasis on online and adaptable learning modalities. Thirdly, interdisciplinary education will also become more prevalent, with design programmes incorporating elements from diverse fields like science, engineering, and business to equip students for multifaceted design challenges. Lastly, collaboration with industry experts and real-world projects will bridge the gap between academia and the professional realm, ensuring that

students are well prepared for their careers. Together, these developments signify a future for design education that is flexible and responsive to change, characterised by its ability to adapt and evolve.

Generation Alpha designers will require a diverse set of technological proficiencies that will be imperative for success in the evolving design landscape. Firstly, a strong foundation in STEM (Science, Technology, Engineering, and Mathematics) skills will be fundamental, encompassing coding, robotics, and engineering principles. Additionally, mastery of 3D printing technologies will be pivotal, facilitating rapid prototyping and product development across various design disciplines. Fashion designers will need competence in Computer-Aided Design (CAD) software like Adobe Illustrator, CLO3D, and Optitex for precise and efficient design work. Familiarity with AI and machine learning concepts will be essential, enabling designers to harness AI-driven design tools and automation. Knowledge of augmented reality (AR) technologies will prove valuable for creating interactive and immersive design experiences, especially in fields like interior design and architecture. Proficiency in digital sketching tools, using devices such as Microsoft's Surface Studio or Wacom tablets, will enhance the design process and collaboration. Big data analytics will be crucial for leveraging data-driven insights in design decisions for future students. Understanding robotics and its applications in garment production will benefit fashion and industrial designers. Quantum computing will be applied in design and simulation, making it a valuable skill for forward-thinking designers. Lastly, proficiency in Industry 4.0 technologies, including the Internet of Things (IoT), will empower designers to create smart and connected products, ensuring they are well equipped for the design challenges of the future.

Generation Alpha designers will have to embrace a broad spectrum of technological proficiencies to thrive in the evolving design landscape, which is inclusive of both traditional design tools and emerging technologies that are reshaping the industry. As a result, design education will play a pivotal role in equipping these designers with the necessary skills and knowledge to excel in their careers.

### Contribution

This research paper examines the current trends and themes in design education for Generation Alpha, focusing on how the field is evolving to cater to their needs in a technologically advanced environment. Through a thematic analysis of existing literature, the study identifies patterns and concepts that inform the future of design education for this cohort. By using the Kano Model, the paper evaluates the significance of skills and features in design education, critiques the current system, proposes strategies for developing essential skills, and contributes to the discourse on shaping the future of design education for Generation Alpha in the fashion design sector.

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