LET'S GET PHYGITAL: A PROJECT INVESTIGATING THE CREATIVE PROCESS OF CRAFTING AR ADORNMENTS

AUTHORS

Mala Siamptani
London College of Fashion, UAL
m.siamptani@fashion.arts.ac.uk

KEYWORDS

Jewellery Design, CAD, Augmented Reality, Education, Creativity.

ABSTRACT

One of the technologies that can be seen as an important innovation in this era is Computer-Aided Design (CAD) (Brown, 2009), which has revolutionised the creative capabilities available to designers and engineers worldwide. In recent years, we have also experienced the rise of related technologies, such as Augmented Reality (AR). These developments have allowed us to view images of the real world and images of computer-generated worlds in the same field of view (Berry et al., 2006). Artificial Intelligence (AI) is another tool evidently on the rise with the development of Open AI systems. Despite the proliferation of numerous software and hardware developments in recent years, one notices a distinct lack of questioning in regard to what influence these digital tools have on the creative process of the designers. The focus of this paper is the study of such digital tool integration specifically in the field of jewellery design. When studying a field so heavily associated with traditional handcraft values, implementing new tools is always faced with challenges.

This paper will present the trajectory of a collaborative project named Let's Get Phygital, which focuses on an experimental approach investigating contemporary jewellery in a digital/non-physical form. In its three consecutive editions (2021-2023) this exhibition-orientated project invited students from three institutions (London College of Fashion, Estonian Academy of Arts, PXL-MAD School of Arts) to take part in a series of lectures and seminars, learning and discussing the use of CAD, AR and AI in digital wearable design.

This study is significant for both educational and industry purposes, as it primarily focuses on advancing knowledge about the jewellery design creative practice and the outcomes of this practice while integrating CAD, AR and AI. In this respect, qualitative approaches were employed towards a comprehensive analysis of how such digital tools have influenced the creative process of these young jewellery designers.

The results indicate that the students taking part in all project editions experienced difficulties using the new digital tools yet found the results very rewarding. It was evident that the lack of CAD knowledge was an obstacle, which students attempted to overcome during the project. Students commented on how designing for a digital environment gave them the opportunity to rethink how they design and how their work interacts with the digital and physical body thus enriching their creative capabilities. The findings of this study also indicate that when used as a design tool, AR allows the user to explore new potentials in design. Each year software updates allowed the introduction of different performing elements such as animations, music/sound or full-body interactions. This resulted in transforming students' creative outputs in ways conventional physical designs had not allowed them to. The findings of this study are particularly significant as projects like the present one have an impact on the skills of future generations of designers.

1. INTRODUCTION

The use of computer-aided technologies in design has had many practical implementations in recent years; from idea generation through design, to advertising and promotion, to fitting and sales. MacLachlan, Earl and Eckert (2012), suggest that in the case of designer-makers, tools are the embodiment of rules working alongside more conceptual rules and conventions, to transform a design problem towards a creative design solution. Thus, it is the designer's role to research and experiment with various available tools and methods to push the design practice forward.

Let's Get Phygital (LGP) is a practical teaching and learning project, set to deepen our understanding of how the use of digital technologies can potentially influence the creative process of jewellery designers. The project was initiated in 2020 and for its third iteration, it aimed at supporting students from three university institutions (London College of Fashion, Estonian Academy of Arts, PXL-MAD School of Arts), to develop a creative design approach while implementing digital technologies in their practice. The collaborative nature of this project supported the sharing of the participants' common experiences and the envisioning of potential future concepts particularly within the field of jewellery design. Following last year's LGP report (Siamptani, 2022), the objectives of the study were:

1) Teach students new software applications,

2) Investigate and interrogate how these digital tools influenced (or not) the students' creative behaviours and design processes,

3) Evaluate students' perceptions when using Augmented Reality as a design tool.

The latest edition of LGP dealt with learning about digital possibilities in the context of contemporary jewellery, including the addition of Artificial Intelligence (AI) as a tool. LGP participating students were invited to prepare for and take part in a series of physical and digital exhibitions, which enabled them to familiarize themselves with the professional sector. Participation was free and did not require any technical skills prior to taking part. Due to the very demanding schedules of all participants, LGP encouraged students to develop pieces related to their current projects in order to subvert conventional design and manufacturing approaches. The project invited a reflection on a more intuitive and freethinking approach to design. Via a series of lectures and practical software explorations, the participants engaged in analyzing new product design interactions using Computer-Aided Design (CAD), Augmented Reality (AR) and Artificial Intelligence (AI) as tools. The project explored how these tools could enhance the potential of young designers in the jewellery field to advance their creative practice and enable them to reassess the contemporary value of jewellery.

This year's LGP project lasted 6 weeks (14th February – 21st March 2023) with each session lasting two and a half hours, separated into a one-hour lecture, one hour of practical learning and half an hour of seminar discussion. During these sessions, the students were introduced to the theory and practice of using CAD, AR and AI technology and were presented with examples of designers currently using such technology. The students were also introduced to digital tools they could download and use for free for the sessions - I shall expand on these tools later. The teaching team provided the students with feedback and support when concluding their designs. The students were then asked to write a brief reflection on their experience via a written statement and a concept description. For the purposes of showcasing the students' work, LGP uses Instagram (META) as a platform due to its built-in AR features. Qualitative methodological approaches were employed to conduct a comprehensive analysis of how the students/ young designers perceive their creative practice while using these digital tools. As this continued to be a project developed within an educational set-up, reflective practice has been at its core. The participants were given a set of questions aimed at understanding how they perceived their creative practice during the project.

Generally, the LGP project invites viewers to try digital jewellery products online and IRL. Last year's LGP exhibition took place between 6-10 July 2022, as part of the renowned Munich Jewellery Week (MJW). The 2023 edition includes a series of exhibitions at the premises of all participating institutions, beginning with an exhibition at PXL-MAD

School of Arts (Hasselt November 9-29 November 2023), followed by an exhibition at EKA (Tallinn 30 November – 12 December 2023), and concluding with an exhibition at LCF (London 14 May-22 June 2024).

The study is significant for both educational and industry purposes as it focuses primarily on advancing knowledge related to the use of digital tools and, by extension, contributes to the wider evolution of the jewellery design field. While some researchers question whether CAD is a tool that provides additional opportunities - if not a weapon that kills traditional handcraft - (Romanenkova et al. 2022), this study will focus more on the experience of the designer while using these tools (CAD, AR and AI).

1. Literature review

According to Poggenpohl (1996), technology is one of the two forces that alter the context within which designers practice, with the global economy being the other. The 21st century opened up new scenarios for the jewellery industry and its future, not only with the introduction of new technologies such as CAD or 3D printing but also through an innovative creative, distribution and communication process ignited by the use of social media platforms. Such developments became very quickly part of this transition from the physical to the digital world.

Social media platforms have started, for quite some time now, replacing print media as the most significant inspiration for jewellery and fashion purchases. Thus, we observe more and more designers attempting to reach out to their audience via these platforms. We can see various fashion and jewellery brands currently using social platforms and digital filters as a new way of reaching their audiences and creating a connection with them in a digital environment. Various objects have in recent years been presented as virtual try-ons. The luxury brand Gucci was one of the brands who rushed to launch 2021 their first virtual shoe which can only be worn digitally using augmented and virtual reality. The object named the Virtual 25 sneaker, was a digital shoe available to purchase and use via apps including VR chat (an online game) and Roblox (a gaming platform).

Much research has been done to understand if AR is influencing consumer behaviours as well as the potential benefits of using this technology (Barhorst, et al.,2020., Bulearca, Tamarjan, 2010., Heller, et al., 2019., Rauschnabel, et al., 2019), yet not much has been addressed regarding the designers' perspective when developing such interactive experiences for their brand. To address this, the current study investigates how AR impacts the designer and their practice. We therefore proceed next to an introduction to the LGP project and its importance in teaching and learning experiences.

1.1 CAD

Jewellery can be considered one of the first domains which have very quickly made use of new technology in the production line. Kai and Gay (1991) were the first to describe the advantages of the integration of digital software and manufacturing in the jewellery industry. Yet in contemporary jewellery practice, we observe a distinct technological divide between traditionalists, who use traditional methods to create jewellery by hand, and modernists who use computer-aided technologies (Romanenkova, et al, 2022., Brown, 2009). This might be due to the fact that the majority of today's highly experienced and successful goldsmiths might have been educated prior to the widespread availability of advanced CAD programs.

In effect, a wide range of jewellery digital modelling-specific software is currently available, including RhinoJewel, JewelCAD, ArtCAM, JewelSmith, and Matrix3D (Bernabei et.al, 2015, Wannarumon, 2011). Brink et al (2022), in a study focusing on teachers who teach CAD, suggest that teachers can combine design with a digital tool and thereby give students opportunities to develop skills in areas like communication and problem-solving. In addition, a study by Oladumiye et.al (2018) suggests that CAD could enhance students' creative behaviour.

1.2 Augmented Reality

Virtual Reality (VR) technology completely separates the user from reality through the use of specifically designed

goggles and allows the user to navigate through a virtual world. In contrast, AR users are not disconnected from reality, they rather experience their perceived reality augmented with virtual information (Graig, 2013). Thus, we can define AR as an innovative media format that integrates virtual information into a user's perception of the real world (Rauschabel et al., 2019). Hilken et al. (2017), suggest that AR is a tool that enhances and supplements the user's imagination allowing them to conceive and visualize a new reality.

Through AR's interactive and immersive nature, we have seen the development of more interesting experiences for the consumer (Hilken et al., 2017, Javorik, 2016). Renowned fashion designer Hussein Chalayan recreated his head-pieces named "Voguing masks", which were originally presented in a physical fashion runway show in 2019, in AR version on the brand's social media in 2020. This allowed the brand's audience to interact and try the digital designs on their body, photograph themselves and share on social media.

Barhorts et al (2020), conducted a study exploring the role of flow in AR experiences. The researchers, using an AR app, analyzed the flow of 500 consumers. The findings of this study suggest that AR presents a powerful way to create an enhanced state of flow for the user and, subsequently, learning, enjoyment and satisfaction in the shopping environment. The results also suggest that practitioners should design AR experiences that balance the attributes of vividness, interactivity, and novelty to better facilitate the consumer experience and immersive state of flow.

When compared with traditional forms of media interaction, research suggests that AR helps the consumer form a closer relationship with the brand (Dacko, 2017; Yim & Park, 2019). This suggests that through AR the brand achieves an overall target audience satisfaction in more depth. In 2020, Louis Vuitton unveiled a colourful Instagram filter, inspired by the brand's rainbow-filled store windows at the time. This allowed online and in-person interaction with the brand.

1.3 AI

In recent years, the use of AI has evolved significantly with various brands pushing the boundaries of how the technology can be used. Global fashion brands Gucci, Burberry, Ralph Lauren, and Louis Vuitton are increasingly deploying AI in designing customer interactions (Joy et al., 2022). Along similar lines, Bulgari, the iconic jewellery brand, used AI to develop a multimedia and multisensory exhibition installation, titled "Serpenti Metamorphosis", created by Refik Anadol. In this exhibition, AI algorithms trained on nature/flower images and produced streams of vibrant, evolving patterns, covering the walls, ceilings, and reflective floors of the exhibition spaces. This installation invited a new relationship between the audience and the brand where new possibilities for interaction and physical experiences were explored.

The jewellery field has, indeed, demonstrated very interesting experimentation with AI. Artificial Intelligems is an artistic research exploring jewellery through the lens of AI technology. It is a collaborative project between Dr. Anneleen Swillen and programmer Greg Scheirlinckx, including AI and jewellery practitioners. The project aims to envision new jewellery species, by importing images of jewellery designers' work into an AI algorithm and thereby generate ornamentations.

1.4 Let's Get Phygital (LGP)

For the third edition of the LGP project, participants came from different design backgrounds including jewellery design and graphic design with various skill levels in digital tools. This year the participants' level of digital knowledge and expertise ranged from novices to intermediate and experienced users. By setting up open calls at the three institutions, we have drawn the attention not only of jewellery students but also of graphics students.

This study examines the creative process and overall experience of the participating students in the use of AR as a tool to realize digital filters for their work.

For the third iteration of LGP, Mala Siamptani (LCF) lecturer, designer and researcher, Darja Popolitova (EKA) design-

er and researcher, and Annelen Swillen (PXL-MAD) postdoctorate researcher, have developed a series of lectures, which involved a consideration of their own personal experiences in the professional design sector. The team organized an outlook framework spanning six sessions. During these six sessions, each researcher covered parts of their own research and understanding of subjects related to CAD, AR and AI.

2. METHODOLOGY

For the purposes of this study, qualitative methodological approaches were employed in order to conduct a comprehensive analysis of how digital tools CAD and AR influence the creative process, particularly of the jewellery designer. Drawing on Schön's (1991) work, reflection-on-action has been deployed, as an approach which involves reflecting on how practice can be developed after the lesson has been taught. Schön recognizes the importance of reflecting back 'in order to discover how our knowing-in-action may have contributed to an unexpected outcome'. Thus, the use of a reflective process aids in obtaining new knowledge about practice, Schön (1991). In order to collect information regarding the role of digital design and AR in their learning and practice, LGP uses reflection during the project, through which we examined the shared patterns and behaviours of the young designers and explored their practice from their viewpoint.

As mentioned above, six sessions took place where one hour was designated for a lecture by one of the three researchers, followed by an hour of practical learning. McGarr & Seery (2011), state that, traditionally, CAD pedagogies start with teaching commands for students to be able to solve specific tasks; thus, LGP participants were given practical step-by-step sessions on the use of three software. Meshmixer was selected by the teaching team as it is a 3D modelling freeform software and free to download. Some animation and material rendering tools were taught using the software Blender. Spark AR was selected as it is specifically designed to create AR filters and is directly linked with Instagram and Facebook as showcase platforms. Following a practical session on Mesh mixer by Darja Popolitova, the creative technologist, Mouhannad Al-Sayegh (LCF), instructed the students on how to use the AR software starting with the basics and following with more advanced tools. All three software programmes are free to download which meant the participants did not have to endure any costs related to this project. For the purposes of LGP, Anneleen Swillen (PXL-MAD), introduced Stable Diffusion Online and Lexica Aperture. Both are online tools that are text-to-image diffusion models capable of generating photo-realistic images in seconds given any text input. Anneleen has demonstrated to the LGP participants how to enter a text prompt on both websites and generate various examples.

All lectures and practical lessons took place via Microsoft Teams and were recorded. This allowed all participants to join the sessions live or to watch the recordings at their own time. Tutorial slots were also part of the LGP project curriculum, giving the opportunity to students to present their work in progress. For all teaching material and tutorials, the online sharing platform Mural was used for students to view all presentations, and recordings and receive feedback from the teaching team on their individual projects. After the completion of all the sessions, students were given time to work independently to produce their digital designs based on their own ideas and research.

Each participating student generated a digital presentation (3D & AR software) of an original design project (1-3 pieces). The final designs were uploaded as filters on each student's professional Instagram or Facebook page. They were then asked to submit a reflective statement and concept description of their project. The reflective statement was set to investigate particularly how the students felt about the experience of using digital tools (CAD, AR, AI). An important goal was to investigate what behaviours these tools and methods of design encouraged during this project. Thus, they were asked the following indirect and open-ended questions (Siamptani, 2022):

• How did you use AR technology in your project?

• What stumbling blocks arose and how were they addressed?

• Did you find the technology workable, interesting, challenging?

• Did the collaboration and solutions of the technology and your design work well or not?

• What lessons were learnt from successes or failures?

• Will you be using this technology in the future?

The participants were given enough time to answer the above questions and without any pressure, they were advised to respond as naturally as possible, while acknowledging the self-awareness involved in conditions where one knows they are being studied. These questions allowed the students to introduce and reflect on their learning experiences during the LGP project.

The participants' responses resulted in rich perspectives on the diversity of design experience allowing us to contribute to design research, practice and education. Braun and Clarke's (2006) six-phase framework was applied in analyzing the students' responses, using a systematic manner. The final designs of the participants were collected and presented online via Instagram, in addition to being presented at the physical exhibitions via iPads and QR codes directing to the students' online profiles/filters.

2.1 Participants and Ethical Considerations

An open call was set out inviting students from Jewellery and Design related courses studying in Years 2-3 at Bachelor level and years 1-2 at Master level from LCF, EKA and PXL-MAD. For the 2023 LGP edition, a total of 19 students were recruited from LCF (11), EKA (4) and PXL-MAD (4) with two to four years of experience in the field of jewellery design. Prior to the beginning of the project and any data collection, a consent form and participation sheet were provided to those who agreed to take part. This consent form informed the participants of their right to withdraw from the study up until the point of data analysis, (two months from the project starting date), in addition to informing them that the findings of the study may be published and used for future teaching purposes.

3. FINDINGS AND ANALYSIS

3.1 Overall course comments

The participants commented on how exceptionally engaging and enlightening the course was for their learning. They mentioned how these lectures and online workshops have enhanced their learning experience with a wealth of new insights gained. The open brief allowed the students to have a sense of freedom of what the outcomes would be. They commented on how LGP allowed them to gain a new understanding of the digital tools used.

S16: "I am so happy and enthusiastic about the result! It is definitely worth trying it out and experimenting with it even more if you don't have a lot of experience in programs like these. Without knowing, it became a path that also translates back into my practice as a jewel maker."

Students experimented with the possibilities of the AR software they were taught. Yawen Luo's (LCF) project explored the boundaries between humans and the virtual world. Borrowing from the virtual setting provided by the software, the student attempted to connect reality to the digital filter (Figure 1).
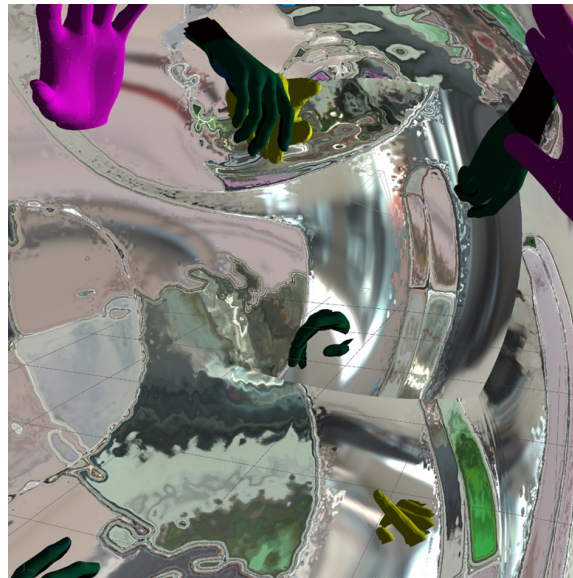
Fig. 1 Digital filter developed by Yawen Luo, 2023

The audience who joined the opening evenings of all the LGP exhibitions had the opportunity to watch videos of the students' outcomes, read the concept behind each design and use their phones to interact with the QR codes in the space, allowing them to directly wear the digital outputs (Figure 2). During the opening nights, panel discussions were also organised by the teaching team. At PXL-MAD, Hasselt, Guus Vandeweerd, one of the panel members and LGP participant, has made a very valid point regarding the uniqueness of the AR filter. While questioned to discuss his experience in developing an AR filter, Guus mentioned how the designer makes this one piece which they share online for the viewer to interact with, and there is only this one piece, there are no replicas, no multiple editions, no recasting of the same object. It is this one piece that was developed by the designer, and it goes directly to the audience, creating this unique relationship between the user and the creator. This was a valuable note and outcome of discussions around the subject of using these tools and the new relationships we generate with the audience.

Fig. 2 Exhibition audience participation via QR codes

3.2 Thematic analysis findings

The thematic analysis has assisted in identifying 7 main themes of the LGP 2023 edition. Some were in agreement with previous years' results (Siamptani, 2022), and some new ones emerged.

1. Fun, interesting sense of fulfilment

In agreement with the LGP 2023 report, in their reflective statements, the participants mentioned that they found the technology and its outcomes fun and playful. Some mentioned a sense of fulfilment when they saw the outcomes of their work come to life. As shown in Figures 3 and 4, students played with scale and digital materiality.
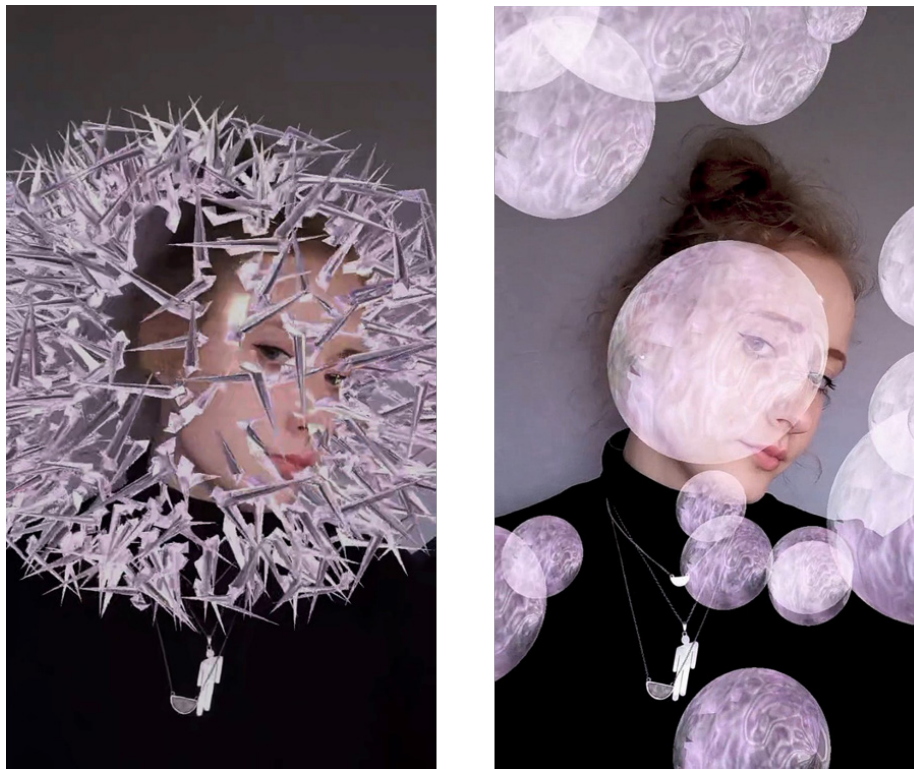

Fig. 3, 4 Digital filters designer by Epp Vislapuu,2023

2. Technical difficulties

Even though students showed enthusiasm for learning new tools, it was evident that they found this process challenging. This is again in agreement with last year's results where the students found it difficult to use new digital tools they were not familiar with. This is in line with the Romanenkova et al. (2022) study where the researcher states the difficulty of learning digital design programs which require special skills. Some participants also mentioned they found it particularly complicated to switch between various software and to be able to understand which tool is the appropriate one for each action in the design process. Understanding the different capabilities of different software is a skill gained from frequent use and years of experience. Thus, a few participants noted that they simplified their designs due to this lack of experience. Some students mentioned that learning new software can be time-consuming and hard work, while others found it especially overwhelming at the beginning of the project to juggle several new software.

3. Perseverance

Students were faced with various challenges during the design process, some with the sizing restrictions, others

with the animation capabilities of the software or with 3D modelling basics. The majority who mentioned facing difficulties also mentioned how they continued to persevere and push forward either by discussing issues with tutors or watching online videos to resolve issues. This is an interesting new finding in this project. The participants showed a clear understanding of the challenges and the importance of overcoming them. It was clear from their comments that they found a way to resolve issues they faced and carry on with their work: S9 "…I was able to address these issues and create a filter that met my ideas. I once again learned that the best way to learn is through my own mistakes.

4. Added software

The taught sessions focused on the free software: Mesh Mixer and Blender for 3D modelling and Spark AR for AR. It was evident that students went beyond the suggested/taught software introductions and used software that they were more familiar with. We observed how Keyshot and Nomad were at times the preferred software. Some students mentioned the freedom of using iPads and Nomad to sculpt their work. Rhino was also mentioned. Students said they felt inspired to familiarise themselves with more digital tools. Procreate was also mentioned and used to add texture and colour to the models of students.

5. New possibilities

Expanding design from the restrictions of the physical world was a recurring comment in students' responses. S14 'I will continue to use digital design in my work as a supporting aspect of my physical creations, I like that I can take my physical designs further in the digital world, expanding my designs from the restrictions of the physical space; and the great benefit of my work being easily shared and seen by many.' Other students noted how much freedom and possibilities they had in creating their filters. This is in line with Bulearca and Tamarjan's (2010) study where they expand on the highly experimental aspects of AR technology. Figure 5 presents the work of Lisandra Turkson (EKA) who experimented with abstract design elements imitating sea creatures and incorporating head motion to create movement. Animated elements allowed the student to express elements not possible with physical making.
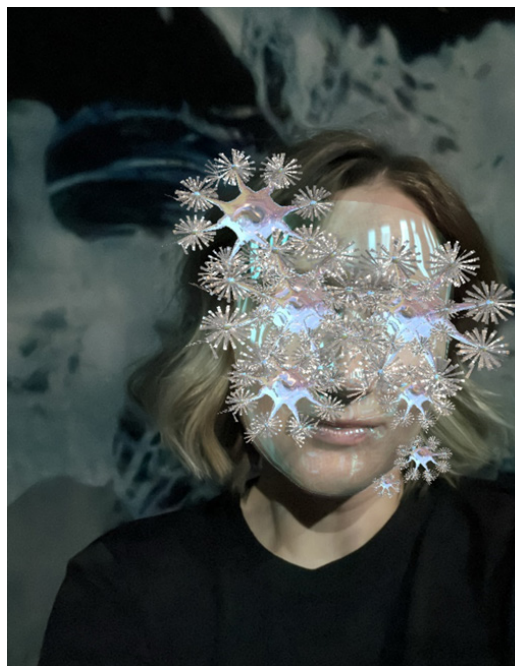

Fig. 5 Digital filter designed by Lisandra Turkson, 2023

S19: '.. the technology I used is interesting since it breaks the rules of traditional jewellery and transforms physical jewellery into virtual objects, which in my opinion gives designers a greater design space in terms of developing a certain product.'

6. Audience

As shown in the previous iteration results, the students understood the capabilities of these technologies in reaching a wider audience. Students in this year's edition have added that they wished to give the audience more options to interact with their work, this being physical and digital interactions. The fact that we use a pre-existing platform such as Instagram, meant that the students could directly interact and communicate via their filters with their on-line audience, thus reducing costs related to physical shops or exhibitions. Costs related to physical making could also be lifted. Rauschnabel et al. (2019) discuss how the cost of manipulating a virtual representation of a product or service through AR is relatively modest while the benefits may approach levels similar to physical trial or physical manipulation as the technology improves.

7. Will use in future work

The majority of the students in both iterations agreed the LGP project has allowed a learning curve during their studies and they expressed their interest in continuing to develop their skills in these software for future design work.

4. DISCUSSION

AR can be considered a more easily incorporated technology in our daily lives, in comparison to other technologies such as VR. This is due to AR's integration with ubiquitous technology, like the smartphone (Heller et.al, 2019). Thus, the LGP project allowed students to use this universally available technology and develop a closer connection to their work, expanding its potential, outreach and relationship with a broader audience.

Points 3 and 4 above were new to the LGP findings. It was clear how the participants showed a mature understanding of the challenges caused by using new tools they were not familiar with and the importance of overcoming these with patience and perseverance. When faced with obstacles some students either directed their questions to the teaching team or turned to online educational videos on the software they were struggling with. This process encouraged more autonomous and independent learning for the students, especially since experimenting with the tools at their own time allowed them closer interaction and deeper understanding.

Breaking from the physical restrictions of physical making and design is opening further discussions on the future of digital products. Romanenkova et al. (2022) mention the unavoidable use of manual labour in jewellery making since computer technologies cannot replace human labour at some final stages, for example, casting or polishing. But what if the object exists only in a digital realm? What possibilities exist there? If Hilken et al. (2017), suggest that AR enhances the users' imagination allowing them to conceive and visualize a new reality, the same can be said for the designer developing work using AR. This is evident in the work of Qiuwen Lyu (LCF), as shown in Figure 6, where the student has developed a set of AR glass eyewear to convey a sense of surreal lightness, in comparison with the heaviness of glassware in reality.

Fig. 6 Digital filter designer by Qiuwen Lyu, 2023

It is evident that in both project iterations, participants and the teaching team understood the scale and importance of experimenting with new tools. In an ever-changing and challenging world, online exhibitions give artists and designers a platform to develop, share and connect with their audience (Romanenkova et al., 2022). Thus, we can agree that AR is one of the most interactive types of technologies which provide consumers with a sensory-mediated environment consisting of high levels of user participation (Barhorst et al. 2020).

What was fascinating in the last two editions of the project was the addition of AI as a tool. In the 2022 LGP edition, one of the students made use of AI in the creation of their filter, out of their own interest and research; this case allowed the teaching team to look at AI as a tool worth investigating and adding to the 2023 curriculum. Surprisingly, no participant made use of this tool for the 2023 edition. One might wonder if we have exposed the students to too many tools for such a short project. Following their reflective comments they did struggle to differentiate which tool was most appropriate for each design part. Therefore, in future iterations, we must consider the project time frame in order to give participants more time to experiment and use the tools.

5. CONCLUSION

It is evident from the findings of this research and literature review that designers using AR benefit from academic insight into how the use of technological tools creates value for both the consumer and the designer. Hence, it is important for designers or brands to understand the value of CAD and AR and how these can be used and exploited for the needs of particular designs or products.

This study is in agreement with the idea that when compared with traditional forms of media interaction, AR helps the consumer form a closer relationship with the designer or brand (Dacko, 2017, Yim & Park, 2019). This suggests that projects like LGP should continue to challenge and develop young designers' skills in an attempt to enhance overall target audience communication and satisfaction.

At the same time, for two years in a row, the participating students' work has evidenced rich new perspectives on the diversity of design experiences. It is a fact that the time given to learn the new tools proved to be quite limited, hence more time is suggested for future iterations. However, overall the importance of overcoming difficulties and obstacles with patience and perseverance was a highlight of this year's LGP iteration. Indeed, learning new tools

was quite challenging, yet it was a challenge that simultaneously allowed students to rethink how they design for a phygital space and how their work interacts with the physical body, thus enriching their creative capabilities and problem-solving skills.
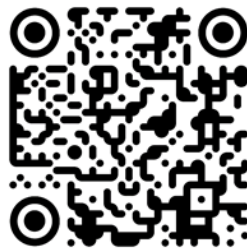

Fig. 7 LGP Instagram page

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