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Integrating research into art and design curricula: A case study from the scientific college of design

Dr. Harini Methuku[1], Dr. Mona Ismail[2], Dr. Hatim Ramadan Mohamed[3]

ABSTRACT

Traditionally, the art and design education system follows a studio-based learning approach. However, integrating research in art and design curricula supports students in enhancing intellectual development and creative ideas, as it equips them with a deep understanding by investigating and applying it in practice. The paper focuses on integrating research into art and design curricula. For this purpose, data were collected from internal stakeholders of the college using a questionnaire that was specifically designed for the purpose. The findings reveal that research helps students understand the precedence and value of art and design research methodologies in contextualizing and developing artworks and designs. Embedding research approaches, such as experimentation, inquiry, practice-based analysis, and reflection, enhances the curriculum and supports students in making artistic and creative decisions. Furthermore, the study reveals that a research-based approach provides students with the opportunity to examine evidence from the theoretical framework, historical facts, and address cultural and societal issues. A research-based learning approach enables students to think innovatively by fostering the development of original ideas and concepts. This also supports the development of interdisciplinary applications that integrate science, technology, and the humanities. Thereby bridges the gap between theory and practice, enabling graduates from the art and design fields to enter diverse roles in the creative industries and beyond in the rapidly developing global landscape.

Keywords: Art and Design Disciplines, Research Methods, Integration, Curricula, and Future Careers.

1. Introduction

Traditionally, education in art and design has often prioritized the development of technical skills, aesthetic sensibilities, and inquiry-based approaches. However, emerging practices in creative fields demand that academicians engage students in varied perspectives of their field, allowing them to analyze designs and articulate their creative ideas, thereby giving clarity and precision to their creative works. This leads to integrating research into teaching and learning to address the needs and inculcate

[1] Muscat, Airport Heights, Matar Street, Sultanate of Oman. Email: harini@scd.edu.om
[2] Scientific College of Design
[3] University of Technology and Applied Sciences, Muscat, Oman

questioning techniques and investigative skills, thereby contextualizing students' creative endeavors. Research-based teaching approaches in art and design bring a significant shift from traditional studio-based methodology, allowing students to foster the critical thinking process and develop creative practices by intellectually enhancing them with the growth in the field from the pre-contemporary period to the present. Integration would help students emphasize and strengthen their creative skills by evaluating researchers and their capability to navigate the challenges in the modern/contemporary art and design areas. Research integration in curricula and by instructors involves teaching materials that empower students to contextualize their art and design work by analyzing recent trends, thereby enhancing their creativity. This encompasses a range of research methods, including qualitative, quantitative, precedent analysis, practice-based, design-based, and the use of emerging methodologies, tailored to the specific needs of the art and design fields (Cross, 2006). In art and design disciplines, practice-based research is highly applied, as creative practice provides students with a form of inquiry used to analyze and develop creative works. This approach allows students to document and analyse the design process (Candy, 2006). Traditionally, this approach supports the analysis and integration of the relationship between the creative process and the investigated data, which enriches the creative work. In addition, other reflective practices gained by applying research allow continual growth in the field (Schön, 1983).

One central aspect of integration is enhancing critical thinking and problem-solving skills by engaging students in developing evidence-based conclusions. Students working in a studio-based environment can research and analyse the needs and requirements of target users by incorporating historical precedents into their design decisions (Biggs & Tang, 2011). In addition, research-based pedagogy values interdisciplinary connections by incorporating elements from technology, science, psychology, and history. Students have opportunities to explore these interdisciplinary connections systematically, fostering a clear understanding of creative work and equipping them with the skills to address complex market/industry needs. Another critical aspect of research is to enhance the design thinking process by developing problem-solving skills. Students develop skills in testing hypotheses by refining their solutions through evidence- and reference-based work, which prepares them to study and navigate the complexities of historical and contemporary design practice, valuing innovation as paramount (Kimbell, 2011). Moreover, research integration allows students to communicate their creative ideas with clear justifications for their decisions. Viewing this from the artists' and designers' professional context, because articulating art and design works needs to consider clients' needs and collaboration with contemporary trends. Research-based learning equips students with creative communication skills and the ability to justify their design decisions. This is very important in the labour market, where these fields are recognised as important and influential in addressing environmental and social challenges.

2. Significance of the study

Integrating research methods is a vital aspect of art and design disciplines, cultivating a culture of lifelong learning among students. For this purpose, students must be equipped with skills to investigate and explore, and educators must take responsibility for empowering them to inculcate the value of ‘learning and growing’ in their professional careers. This is a crucial step due to rapid advancements in technology. Incorporating research as an integral part of the curriculum allows creative practice and prepares students to understand precedence, adapt to change, and contribute innovation in art and design disciplines.

3. Literature review

3.1 Research approaches in art and design

Art and design fields are often considered inherently subjective. They employ various research practices to move from aesthetic form to contemporary end by understanding the concepts, processes, contextual influences, and societal impacts. This paper examines the primary research methods employed in these fields, highlighting their strengths and weaknesses, and adheres to formal referencing guidelines, such as those outlined by the American Psychological Association (APA).

3.1.1 Theoretical and precedents research

The art and design fields benefit from studying theoretical and historical perspectives. This information enables readers to understand creative practices and develop concepts or frameworks within a critical context. These approaches allow researchers to provide a critical perspective in their respective art or design field by fostering a clear understanding of historical developments, theoretical dimensions, and cultural values. The approaches include:

a) Aesthetic Theory is a philosophical approach to investigating beauty and artistic experience, developing theoretical frameworks to understand and assess the aesthetic judgments of artists or designers (Carroll, 2000).

b) The visual cultural studies approach helps to explore visual images and different media used to give an artwork or design a cultural and social identity. It is mainly helpful in interpreting the dynamics embedded in the visual representation of thoughts and their impact on society (Mirzoeff, 2009).

c) Semiotics studies symbols and signs, as well as their interpretation, to analyze the varied meanings used in creating visual communication (Chandler, 2007).

d) History and Criticism allow us to examine developments that took place historically in the respective art/design field and allow us to analyze movements, style, and creative works' social significance (Nelson & Shiff, 2017).

3.1.2 Design research

Design research encompasses a variety of practices used to study user needs, develop innovative solutions, and evaluate the overall impact of design interventions. This approach integrates quantitative and qualitative methods to analyze design and provide potential solutions. However, employing specific methods, such as user research, action research, design ethnography, prototyping, and iteration, yields more comprehensive information.

a) User research involves surveys, interviews, focus groups, and ethnographic (cultural) studies to collect and study user preferences, needs, and behavior. Sanders and Stappers (2008) have emphasized the value and use of ‘co-creation’ in design research, which allows users to share their viewpoints actively during the design process. This method is important as it focuses on the human-centered design process, ensuring that solutions in the designs are relevant and practical to the user's needs from the concept phase to the final solution.

b) Action research is a collaborative inquiry approach wherein researchers cooperate with the stakeholders to develop real-world design solutions and address the challenges. This practical application is often used in community-based design projects (Reason & Bradbury, 2008).

c) Design ethnography is a qualitative approach that combines designers' thinking and ideas with ethnographic methods to study the cultural context of designs and provide culturally sensitive solutions (Suchman, 2007).

d) Prototyping and iteration design research focuses on the iterative design style, where the designer develops prototypes, tests them, and refines them based on user feedback. This approach is important as it enables the optimization of design solutions and continuous enhancements (Brown, 2009).

3.1.3 Qualitative research

Qualitative research is significant in art and design as it enables researchers to explore meanings, subjective experiences, and interpretations. This method is valuable for exploring the complex aspects of art and design. Some of the widely used methods are:

a) Case studies examine individual artists, designers, or projects, enabling the researcher to gain detailed insights (Yin, 2018).

b) Observation is another method that researchers use. They observe and document creative processes, understand user behaviors, and design interactions by offering contextualized insights (Spradley, 1980).

c) Content analysis is used to study textual materials and visuals, such as designed documents and artworks, including user feedback, to identify themes, meanings, and patterns (Krippendorff, 2018).

d) Interviews are another method that the researchers use during data collection. They develop structured, semi-structured, and unstructured primary data collection tools to collect the perspectives of designers, artists, and stakeholders (Seidman, 2013).

3.1.4 Quantitative research

In art and design, the quantitative method is less prevalent than the qualitative method. However, quantitative methods can support data interpretation and contribute to advancing the field of study. The questionnaire titled "*Integrating Research into Art and Design Curricula: A Case Study from the Scientific College of Design*" aims to gather insights from students and faculty regarding the incorporation of research in art and design education.

It comprises two main sections: demographics and perceptions of research integration. The survey explores opinions on the role of research in curriculum development, teaching methods, learning outcomes, and professional preparedness. Participants respond using a 5-point Likert scale. The data collected will contribute to evaluating current practices and enhancing the integration of research within creative disciplines, thereby supporting both academic and industry relevance.

. This is because quantitative research provides valuable data support for design decisions, particularly in assessing the impact of creative interventions. Some of the examples include:

a) Experimental studies are used to evaluate the impact of visual stimuli, test the effectiveness of design interventions, and provide evidence for decisions made in the creative process (Shadish, Cook, & Campbell, 2002).

b) Data visualization is a method for visualizing data, which is used to identify patterns, provide insights into larger datasets, and study trends in art and design (Few, 2012).

c) Surveys are one method that helps collect data on user preferences, behavior, and attitudes, and generate statistical evaluations by providing clear insights into user needs and design trends (Fowler, 2013).

3.1.5 Practice-based research

Researchers widely employ this approach, as it suggests a creative process and a form of knowledge generation, wherein the design or artwork artifact becomes a tangible display of the research. Smith and Dean (2019) define PBR as "*original investigation undertaken to gain new knowledge partly using practice and the outcomes of that practice*" (p. 26). Practice-based research is primarily valuable as it establishes a clear relationship between theory and practice, enabling the researcher to explore complex aspects of the creative work. However, this approach includes high-level design process documentation using logs and other working sheets. As a reflective process, it helps the researcher articulate and apply knowledge through hands-on experience. Nevertheless, this method has its challenges in explicitly depicting the dissemination of findings, as it is mainly subjective. Therefore, artists and designers using this method in conducting research usually supplement it with other research methodologies to validate research findings with substantial evidence.

3.1.6 Emerging methodologies

While traditional research methods, as stated above, these fields are continuously emerging with new research methods, such as (Dunne & Raby, 2013):

a) The Digital Humanities approach is an innovative technique that utilizes computational tools to analyze and interpret data, creating new forms of digital work.

b) Generative Design and creative coding utilize software and computer-generated algorithms to explore computational creativity, creating art and design outputs.

c) Material research investigates materials and properties through experimentation to explore new locations or aspects for varied art and design material innovations.

d) Speculative design explores the future by critically considering emerging technologies and social issues in art and design.

Studying the varied research methodologies justifies the use of multiple research methods and approaches in art and design, integrating theory, precedent, practice-based, qualitative, and quantitative

methods. This diverse approach enables researchers to develop new knowledge and discover innovative solutions, fostering continuous evolution and development in the art and design fields.

4. Research framework

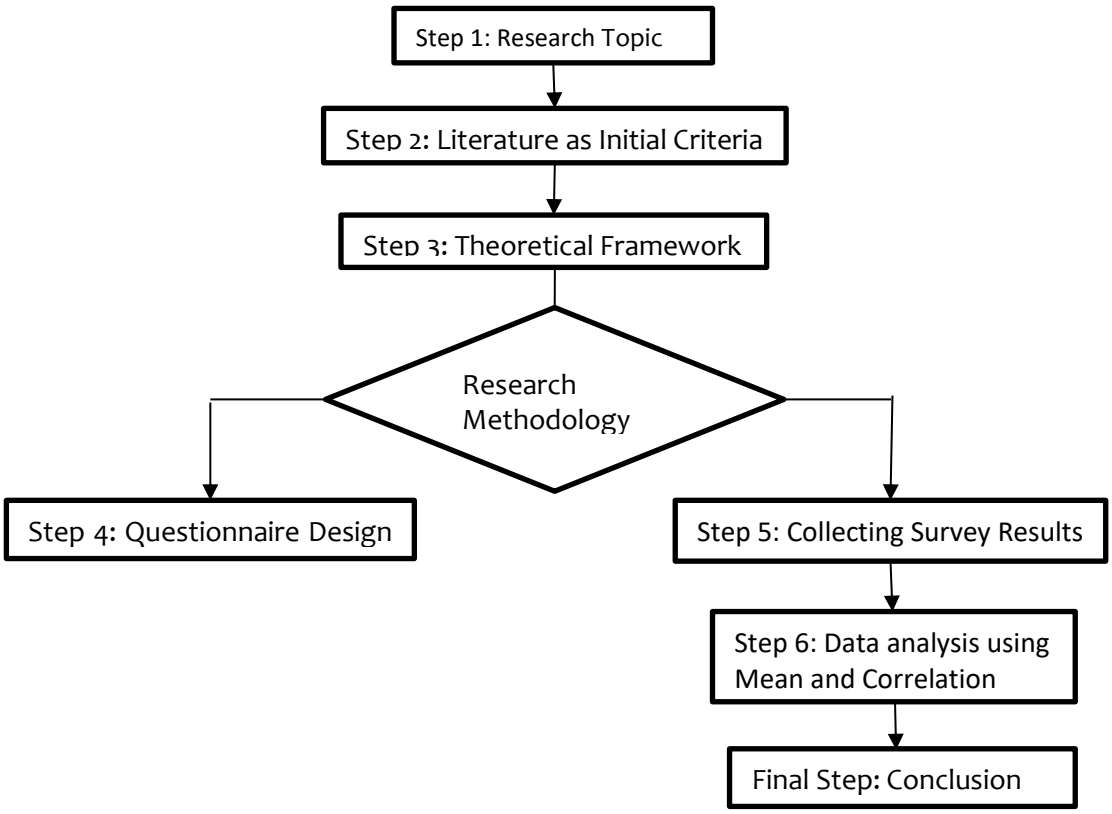

Figure 1. Research Framework.

4.1 Research questions

4.1.1 Does integrating varied research techniques and methods impact students' investigation and problem-solving skills through the critical thinking process?

4.1.2 What are the effective strategies art and design instructors use to integrate research into their teaching approaches?

4.1.3 What interdisciplinary research approaches can be incorporated into art and design coursework and projects to foster creativity?

4.1.4 How does integrating research in art and design pedagogy help prepare students for the research-driven and interdisciplinary job market?

4.1.5 Does research in the pedagogy of creative fields affect students' mindsets regarding the social and cultural aspects of their future careers?

4.2 Research objectives

4.2.1 Analyze the cognitive benefits of applying research practices by exploring students' analytical abilities in addressing creative challenges.

4.2.2 Identify widely used pedagogical approaches and their practical aspects for implementation.

4.2.3 Explore interdisciplinary research methods and broaden students' perspectives to achieve creative outcomes.

4.2.4 Investigate real-world applications in education and their effects on students' future careers in the art and design fields.

4.2.5 Examine the value of research in deepening students' understanding of the course content and enhancing their contextual awareness to broaden their creative endeavors.

4.3 Data analysis

The questionnaire titled "Integrating Research into Art and Design Curricula: A Case Study from the Scientific College of Design" aims to gather insights from stakeholders regarding the incorporation of research in art and design education. It comprises two main sections: demographics and perceptions of research integration. The survey explores opinions on the role of research in curriculum development, teaching methods, learning outcomes, and professional preparedness. Participants respond using a 5-point Likert scale. The data collected will contribute to evaluating current practices and enhancing the integration of research within creative disciplines, thereby supporting both academic and industry relevance.

Table 1.

Reliability.

Reliability Statistics	
Cronbach's Alpha	No. of Items
.87	12

The reliability analysis was conducted on a 12-item questionnaire designed to measure the effective use of research in course development, teaching, and evaluating students' performance. The result indicated good internal consistency, with Cronbach's alpha (α) = .87, suggesting that the items are highly reliable and consistently measure the effective use of research.

Table 2.

Gender of the respondents.

Gender	Frequency	Percent	Cumulative Percent
Male	428	47.7	47.7
Female	469	52.3	100
Total	897	100	

Chart 1: Gender of the respondents

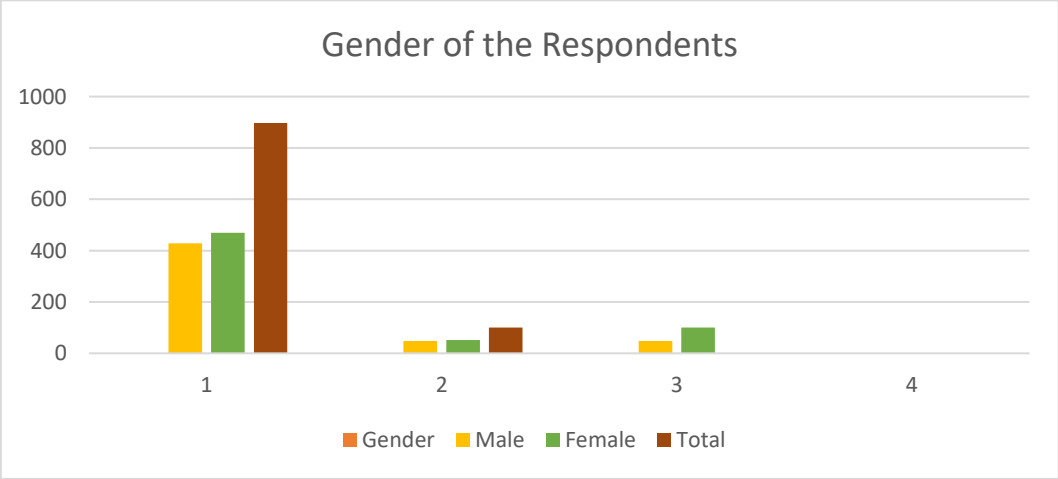

Table 3.

Descriptive statistics.

Items		DEV 1	DEV 2	DEV 3	DEV 4	IMP 1	IMP 2	IMP 3	IMP 4	EVE 1	EVE 2	EVE 3	EVE 4
N	Valid	897	897	897	897	897	897	897	897	897	897	897	897
Mean		5	5	4	3.99	3.36	5	5	5	4	4	4	3.69
Std. Deviation		0	0	0	0.173	0.766	0	0	0	0	0	0	1.305
Variance		0	0	0	0.03	0.587	0	0	0	0	0	0	1.704

The quantitative items used to gauge respondents' perceptions of the course development process and research outcomes were coded as DEV1, DEV2, DEV3, and DEV4. When it comes to the process of implementing or delivering courses developed based on research outcomes in the Scientific College of Design, the items were coded as IMP1, IMP2, IMP3, and IMP4, respectively. Items representing the evaluation process of the courses developed based on research outcomes were coded as EVE1, EVE2, EVE3, and EVE4, respectively.

The table above shows the total number of participants in this study, namely 897 stakeholders, comprising academic staff, students, and administrative staff. Further mean values were calculated to provide a brief descriptive summary of the data collected via a structured questionnaire. It was found that the mean values varied between 3.36 and 5. Additionally, standard deviation and variance were also calculated to determine the dispersion of the respondents' responses—the values of both standard deviation and variance range from 0 to 1.74.

Table 4.

Correlation.

Items/ Constructs	DVE	IMP	EVE	Means
Course development	1	0.193	0.515	0.56
Course implementation	0.193	1	0.257	0.48
Course evaluation	0.515	0.257	1	0.59

The course development and implementation variables were significantly correlated, r (897) = .193, p < .01. The study revealed that stakeholders' opinions of the Scientific College of Design are statistically significantly correlated regarding course implementation and the course development process within the college. This, in turn, implies that the college's efforts are in the right direction to achieve program learning outcomes through the use of the research component as a major contributor to the course development process. The course development and evaluation variables were significantly correlated, r (897) = .515, p < .01.

The study revealed that the opinions of Scientific College of Design stakeholders are statistically significantly correlated regarding course development and the course evaluation process within the college. This, in turn, implies that the college's efforts are above average in the right direction to achieve program learning outcomes and graduate attributes through the use of the research component as a major contributor to the course development and evaluation processes.

The course implementation and evaluation variables were significantly correlated, r (897) = .257, p < .01.

The study revealed that the opinions of Scientific College of Design stakeholders are statistically significantly correlated regarding course implementation and the course evaluation process within the college. This, in turn, implies that the college's efforts are moderately in the right direction to achieve the program learning outcomes and graduate attributes through the use of the research component as a major contributor to the course development and evaluation processes.

Chart 2. Correlation

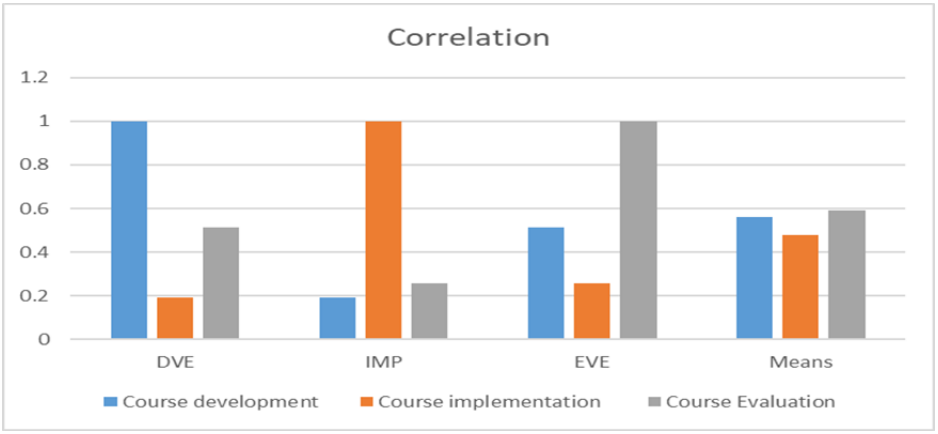

Table 5.
One-sample T-Test for course development.

Questionnaire items	Mean	Std. Deviation	Std. Error Mean
Course development question 1	5.00	.000[a]	.000
Course development question 2	5.00	.000[a]	.000
Course development question 3	4.00	.000[a]	.000
Course development question 4	3.99	.173	.006

The questionnaire item, which reads, 'Reflection of art and design-based research in course materials helps students know trends in the field,' uses the standard error to determine how statistically close the sample mean is to the population mean. In other words, the respondents' opinions are reliable for generalization to the entire stakeholder group of SCD.

Table 6.
One-sample T-test for course implementation.

Questionnaire items	Mean	Std. Deviation	Std. Error Mean
Course implementation question 1	3.36	.766	.026
Course implementation question 2	5.00	.000[a]	.000
Course implementation question 3	5.00	.000[a]	.000
Course implementation question 4	5.00	.000[a]	.000

The questionnaire item, which reads, "Course learning outcomes should facilitate the learning process of conducting research," is accompanied by the standard error, used to determine how statistically close the sample mean is to the population mean. In other words, the respondents' opinions are reliable for generalization to the entire stakeholder group of SCD.

Table 7.
One-sample T-test for course evaluation.

Questionnaire items	Mean	Std. Deviation	Std. Error Mean
Course evaluation question 1	4.00	.000[a]	.000
Course evaluation question 2	4.00	.000[a]	.000
Course evaluation question 3	4.00	.000[a]	.000
Course evaluation question 4	3.69	1.305	.044

The questionnaire item, which reads, 'Integrating research in art and design disciplines prepares students better for the job market,' uses the standard error to determine how statistically close the sample mean is to the population mean. In other words, the respondents' opinions are reliable for generalization to the entire stakeholder group of SCD.

5. Challenges and recommendations

#	Challenges	Recommendations
1	Art and design programs primarily rely on theory, precedent, and practice-based approaches, which do not align with the methods of scientific research.	Effective implementation of creative exploration involves validating it through a practice-based and evidence-based approach.
2	Most art and design curricula focus on a practice-based approach, leading to a skills gap in developing a scientific research approach and engaging in academic inquiry.	The integration of diverse research methods in undergraduate art and design programs encourages interdisciplinary research skills and fosters the development of research capabilities.

3	Minimal integration of research component in coursework.	Encourage collaboration and the use of interdisciplinary research fields such as technology, psychology, and the humanities, which helps students gain increased visibility and relevance to their field of study.
4	Undervaluation of adding a research component in the coursework and limited initiatives.	Develop or integrate research into curricula and establish a dedicated research centre by allocating internal research grants to students.
5	In the art and design fields, it is often assumed that research is less impactful and is not easily quantifiable.	Collaborate with industries and other community partners to develop research proposals in art and design fields, emphasizing social, economic, and cultural impact, and seek potential external funding opportunities.

The study outcomes reveal that fostering a culture of inquiry that encourages curiosity and critical engagement among students leads to achievement in student learning outcomes. This is encouraged through the establishment of interdisciplinary research hubs to promote collaboration across creative and academic domains. Additionally, faculty development and the incorporation of emerging technologies and digital tools are necessary to enhance practice-based experimentation. This is achieved through institutional planning, which involves embedding practice-led research frameworks within studio-based learning and building strategic external partnerships to enhance research impact and real-world relevance.

6. Future direction

The future direction for integrating research into the curricula of art and design programs can be explored several directions that warrant more investigation and development: creating a culture of inquiry; creating interdisciplinary hubs; adopting emerging technologies; creating practice led research frameworks; creating external partnership for research; fostering research dissemination and impact; integrating ethical concerns in research; longitudinal studies of the effects of research integration. To develop a culture of inquiry, higher education institutions may take research beyond isolated projects to create an institution-wide culture in which inquiry and evidence-based practice become integral to all learning and making activities. This can involve dedicated research seminars, workshops integrated within studio courses, and faculty development initiatives focused on research methodologies for art and design. Initiating dedicated interdisciplinary hubs or open collaboration areas that encourage students and faculty from different art and design fields (and maybe other fields like technology, business, and social sciences) to get together for joint research projects. This can lead to innovative solutions and advance the field of creative exploration. For adopting emerging technologies in research, higher education institutions need to actively explore and embrace them not only as tools of creation, but also as powerful research tools. This includes the application of AI in data analysis and investigative creativity, as well as the use of VR/AR in user research and experiential immersion, and digital platforms for research collaboration and dissemination.

A critical strategy is to formalize and develop frameworks for practice-led research, targeting the dimensions of various art and design disciplines. This entails establishing clear guidelines for documenting the creative process as a method of inquiry, codifying tacit knowledge, and critically analyzing creative outputs as research outcomes. Models such as the Digital Humanities approach above can serve as inspiration. Another strategy could be to create external partnerships for research by proactively cultivating collaborations with creative industries, cultural institutions, and community organizations to identify real-world research issues and create opportunities for applied research for students. This creates pathways for future careers and renders their research applicable. To foster the dissemination and impact of research, institutions should develop venues and engagements that promote the dissemination of research findings by students and staff beyond the academic realm. This

can include exhibitions with research components, publication in design journals or conference proceedings, and presentation to industry partners and the general community, emphasizing the social, economic, and cultural contribution of art and design research. As research becomes increasingly integrated, there is a growing need to incorporate ethical concerns related to art and design, including intellectual property, cultural sensitivity, and the responsible use of new technology in the creative process. Another strategy is to conduct longitudinal studies to assess the long-term impact of research integration on students' creative development, critical thinking skills, and future careers. Such data will be highly beneficial for curriculum development and arguing the case for the centrality of research in art and design education.

7. Conclusion

The integration of diverse research approaches, from theoretical research through to practice-based experimentation and emerging digital technologies, enhances a more robust and adaptive learning experience. Integrating research into art and design curricula empowers students to become reflective thinkers, innovative practitioners, and effective communicators. It enhances their ability to justify creative decisions, understand disciplinary contexts, and address societal challenges. By combining theoretical, practice-based, and digital research approaches, institutions foster adaptive learning that transcends the theory/practice divide and prepares students for the evolving global creative economy. Despite challenges, implementing strategies such as cultivating a culture of inquiry, promoting interdisciplinary collaboration, embracing emerging technologies, and building external partnerships can strengthen curricula. Research integration does not limit creativity—it amplifies it, equipping graduates with the critical tools to innovate with purpose and shape the future of art and design.

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