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Form the Editorial

Dear Readers, Authors, and Colleagues,

As we introduce the first issue of 2025, we are pleased to present the latest volume of the *Journal for the Interdisciplinary Art and Education (JIAE)*. Our journal continues to serve as a platform for interdisciplinary discussions on art and art education, bringing together innovative methodologies, critical reviews, and experimental approaches to understanding art's evolving role in education and society.

The **March 2025 (Spring) issue** features a diverse selection of articles covering contemporary and interdisciplinary topics, including:

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An interview with Dr. Marie Bird on vocal performance and cabaret
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These articles contribute valuable perspectives to interdisciplinary art studies, blending theoretical insights with practical applications.

We extend an open invitation to researchers, artists, and academics to submit their work to JIAE for upcoming issues. Your contributions help advance interdisciplinary discussions in the fields of art and art education. Additionally, we are actively seeking scholars to join our *Editorial Board*, bringing their expertise to our peer-review process and strengthening the academic integrity of our journal.

We are excited to announce our upcoming *Special Issue: "Art with AI, New Aesthetics and Ethics,* which will explore the intersection of artificial intelligence, aesthetics, and ethics in contemporary artistic practices. We welcome submissions that examine AI-driven creativity, the evolving definition of art, and the ethical challenges posed by AI-generated works. The submission deadline is *September 15, 2025,* and further details can be found at this link

We express our deepest gratitude to our authors, reviewers, and readers for their ongoing support. We hope that this issue stimulates new conversations and research directions in interdisciplinary art and education.

Warm regards

JIAE Editorial

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Research Article

The effect of a mural activity on health students' hopelessness and social integration levels[1]

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Article Info	Abstract
	The application of artistic works on walls is called mural. Mural painting has been used as an intervention in health-related projects. In this study, visual arts and the concept of metacognition were structured, combined and presented as activities. It was conducted to determine the effect of mural metacognition activities with the students of the Faculty of Health Sciences on the despair and social integration levels of the students during the COVID-19 period. The research was planned as quasi-experimental with a pre-test and post-test design. The project was conducted with 55 students. The study data were collected using an online questionnaire. The questionnaire consists of an information form, the Beck Hopelessness Scale and three sub-dimensions of the Social Integration Scale. Percentage, mean, and t-tests were used to analyze the data. Eighty per cent of the students participating in the study were female, with a mean age of $20{,}80\pm0.9$ years. 60% of the students were studying nursing, 11,1% in midwifery, 15,6% in physiotherapy and rehabilitation, and 13,3% in nutrition and dietetics. 60% of the students evaluated their academic achievement as good. When the total score of the educational integration sub-dimension of the social integration scale was compared, there was a difference between the pre-test and post-test scores ($p=0{,}035$; $p<0{,}05$). At the end of the research, nine mural drawing and painting activities were conducted. The mural activity reduced students' hopelessness levels and contributed positively to their educational integration levels. Metacognition can be used as a basic parameter in future mural academic studies on visual art.

To cite this article

Introduction

Metacognition is the individual's awareness of his/her own thinking processes during his/her activities and his/her ability to control these processes. In order for an activity to be considered in the metacognitive context, it has been defined that it should have some characteristics. Metacognitive activities include planning a learning task, using appropriate skills and strategies, monitoring learners, self-evaluation and self-correction. While these are happening, learners are expected to be aware of distracting stimuli (Goldberg, 2005; Silva Pacheco, 2020). In one study, a mass measurement tool related to metacognition was developed, and in the same study, as a suggestion for future studies, the importance of individual measurements, changes and evaluations was emphasized (Gutierrez de Blume et al., 2024). The

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findings of another study on self-confidence and academic motivation made strong recommendations for educational policies and practices, and it was emphasized that training and activities should be structured with metacognitive awareness. It was concluded that this would increase the learning experience and students' awareness (Shukla & Singh, 2024). The source of the current study is the needs and recommendations of this current literature. It is important to observe how an activity in accordance with metacognitive training standards will change the research parameters of individuals. However, when the literature is analyzed in depth, the publications on the use of visual arts as a metacognitive tool were concentrated five years ago and earlier, and there are few current publications (Van de Kamp et al., 2015; Goldberg, 2005; Silva Pacheco, 2020; McCollum, 2019; Burns, 2018).

Visual art activities have been proven to have positive effects on human health (Cakmak et al., 2020; Ozlem, 2020). In a study conducted by Demir (2017), it was stated that art initiatives are effective in many psychosocial problems. The mural used in this research is a painting art technique. A mural is explained as a painting on the wall. The application of works of art on the walls is called mural. The mural is an English word, and since it is the name of an artistic technique, it is used in the same way in Turkish academic publications (Toy & Gorunce, 2018; Sprague et al., 2011). Mural painting activities have been used as an intervention in health-related projects (Sprague et al., 2011). A study found that mural activities positively affected health outcomes in disadvantaged groups (Bhardwaj, 2013). The power of art can be used for health sciences faculty students adversely affected by COVID-19 (Yanık & Yesilcinar, 2021). Students can be considered as disadvantaged groups in this context. The psychosocial health of health sciences faculty students, as well as all health workers, has been negatively affected by the COVID-19 period, and the level of hopelessness has increased (Bayulgen et al., 2021; Yanik & Yesilcinar, 2021).

Social integration can be defined as the state of complementarity between various elements of a community, group or social structure that make up a society. Social integration is a multidimensional concept that deals with the perception of the individual in social relations. It is the whole of perceptions in many dimensions such as family, education, environment, national and spiritual. In order to ensure social integration, socialization, which was neglected during the COVID-19 period, is very important. The quarantine initiatives implemented during the COVID-19 period caused problems with social integration. The perceptions of social integration were negatively affected by health workers who worked very intensively during the process and students who were worried about the future (Çatiker et al., 2020).

The psychosocial health of health sciences faculty students, as well as health workers, was negatively affected by the COVID-19 pandemic. The power of art and mural techniques can be used to intervene in the levels of hopelessness and social integration of individuals who are students during the COVID-19 period. This may help students use art as a coping method when they graduate. When students are appointed as health workers, they can use art to improve the quality of their care (Kaya et al., 2016). The mural art activity planned within the scope of this study is a unique application for students. The mural activity addresses an aspect of evidence-based art initiatives that have not been implemented before. Students who have had very difficult days during the COVID-19 pandemic can convey their feelings and thoughts that they cannot express to each other by talking and making art together. There are many initiatives for students in our country (Eyupoglu et al., 2020; Karpaviciute & Macijauskiene, 2016). As in this study, no artistic activity using the mural technique has been encountered. It is thought that it will contribute to the literature in terms of technological, methodological, and theoretical aspects and will be a starting point for the unaddressed aspects in the literature mentioned above.

Aim of Study

The mural initiative planned to be carried out by the students was conducted to determine the effect of the mural activities carried out with the students of the Faculty of Health Sciences during the COVID-19 period on the hopelessness and social integration levels of the students. Objectives in line with the purpose;

It is aimed to determine the decrease in students' hopelessness levels. In measurable terms, it is to determine a statistically significant decrease in the Beck Hopelessness Scale post-test mean scores of the students compared to the pre-test scores.

Determining the increase in students' perception of social integration. In measurable terms, it is aimed to determine a statistically significant increase in the post-test mean scores of the three sub-dimensions of the Social Integration Scale named social-environmental, local and educational integration compared to the pre-test scores. Hypothesis of study;

H1a: Mural activities have an effect on nursing students' hopelessness levels.

H1b: Mural activities have an effect on nursing students' perceptions of social-environmental integration.

H1c: Mural activities have an effect on nursing students' perceptions of local integration.

H1d: Mural activities have an effect on nursing students' perceptions of educational integration.

Method

Research Model

The project was designed as a quasi-experimental one-group with a pre-test and post-test design. The independent variable of the research is mural activities; the dependent variable is hopelessness and social integration.

Sampling

The population of the study consisted of all students studying at the Faculty of Health Sciences according to 2021 student statistics (N=1354). The distribution of the number of students according to the departments is as follows. Emergency Aid and Disaster Department: 142, Nutrition and Dietetics Department: 81, Midwifery Department: 349, Physiotherapy and Rehabilitation Department: 245, Nursing Department: 537 students. A purposive convenience sampling method was used in the study. All students in the population who met the research criteria were included in the sample. Criteria for inclusion of students in the sample: Being an undergraduate student of the Faculty of Health Sciences. Volunteering to participate in the research. Being among the first 55 students who responded to our announcement in writing.

In order to determine the minimum number of students to be included in the sample, power analysis was performed in the GPower 3.1 program before the research. Beck hopelessness scale scores obtained from previous similar studies were used as a reference for power analysis. As a result of the analysis performed by taking alpha (α) = 0.05 power 1- β (beta) = 0.90 standard deviation 10%, it was calculated that there should be at least 26 individuals in the sample. In order to determine the students who met the inclusion criteria, a written announcement was made to the entire faculty, and the first 55 students who wanted to participate in the study and who responded to the announcement in writing were included in the study.

Data Collection Tools

The study data were collected using an online questionnaire form prepared by the researchers with the help of Google Forms. The questionnaire consists of two parts. The first part consists of questions questioning the socio-demographic characteristics of the participants and their interest in art (13 questions). The second part includes the Beck Hopelessness Scale (BHS), consisting of 20 items, and three sub-dimensions of the Social Integration Scale (SIS), consisting of 22 items.

Beck Hopelessness Scale: It aims to measure the future expectations and pessimism levels of individuals. The higher the score obtained from the scale, the higher the hopelessness level of the person is considered. The Turkish validity and reliability study of the scale was conducted by Seber et al. (1993). The scale has 20 items, is scored between 0-1, and consists of yes and no answers. The scores that can be obtained from the scale vary between 0-20. In the study conducted by Demir-Barutcu (2022), the Cronbach Alpha reliability coefficient was found to be 0.87. In our study, this ratio was found to be 0.84.

Social Integration Scale: It was developed to measure students' perceptions of social integration. Turkish validity and reliability study were conducted by Simsek and Simsek (2013). The whole scale consists of 47 items. Social Integration Scale (SIS) consists of 6 dimensions: integration with social environment (8 items), local integration (5 items), familial integration (7 items), educational integration (9 items), national integration (10 items) and normative-spiritual integration (8 items). In this study, integration with social environment (8 items), local integration (5 items), and educational integration (9 items) sub-dimensions were used. In this study, three sub-dimensions of the scale, which are

appropriate for the content of our research, were used. These are the integration with social environment sub-dimension, local integration sub-dimension, and educational integration sub-dimension. Cronbach′s alpha reliability coefficients were found to be 0.85 for the social integration sub-dimension, 0.76 for the local integration sub-dimension and 0.72 for the educational integration sub-dimension (Simsek & Simsek, 2013). In our study, the reliability coefficient was 0.94 for the social integration sub-dimension, 0.79 for the local integration sub-dimension and 0.91 for the educational integration sub-dimension.

Process

The study was conducted in the canteen indoor walls of the Faculty of Health Sciences building of Tokat Gazi Osmanpaşa University in the academic year 2022-2023 (June 2022-January 2023). The pre-test questionnaire application was applied online with the help of Google Forms to 55 participants invited to the study. The mural activity was carried out every week during the day and at a time convenient for the students. The mural activities were carried out manually on nine canteen walls determined by the administration in the building of the Faculty of Health Sciences of Tokat Gazi Osmanpaşa University. Students were informed about metacognition. Before the activity started, the students were motivated to do the activity consciously and be aware of the environment and their teammates. In this stage, the planning, skills, self-evaluation, self-correction and awareness stages of metacognitive activities were taken into consideration (Goldberg, 2005; Silva Pacheco, 2020).

Each activity session lasted an average of two hours. The number of sessions was at least three and at most five times, depending on the content of the selected visual. The students projected the selected visuals on the wall with the help of projection and computer, drew them on the wall with a pencil, and then completed the mural activities by adding the colours and additional shapes they wanted with the help of oil paint and brush. In the selection of the visuals, the students′ wishes were prioritized, and themes related to their departments were ensured. They had a social time while painting during the activity. After the activities, the same questionnaire was filled out again as a post-test.

Statistical analysis

Skewness and Kurtosis Tests and Z values were analyzed to determine the normal distribution of the data. Skewness and Kurtosis values were in the range of +2 and -2. It was determined that the data were normally distributed. The data of the study were evaluated on the computer using the SPSS 25.0 (Statistical Package For Social Sciences) programme. Percentage and mean were used in the analysis of the data. A paired sample t-test was used for intra-group comparisons of the pre- and post-tests of the scale. The significance level was accepted as 0.05 in all statistical procedures used in the research.

Results

Eighty per cent of the students participating in the study were female, and their mean age was 20.80±0.9 years. 60% of the students were studying nursing, 11.1% were in midwifery, 15.6% were in physiotherapy and rehabilitation, and 13.3% were in nutrition and dietetics. According to the post-test data, 55.6% of the students were in the third grade, 28.4% were in the second grade, and 15.6% were in the fourth grade. The students evaluated their academic achievement as good by 60% and medium by 40%, and there were no students who evaluated their academic achievement as bad. The income status of 42.2% of the students is equal to income and expenditure; 33.3% of the students′ income status is less than income and expenditure; 24.4% of the students′ income status is more than income and expenditure. None of the students work anywhere. When the students were asked which type of art they were interested in, five students stated that they were interested in music, and nine students stated that they were interested in painting. The rate of students who are interested in painting is 46,2%. The rate of students who think that they have talent in painting is 26,7%; the rate of those who think that they have partial talent is 44,4%. 13,3% of the students have received a painting education before. The rate of students who think that the art of painting is effective in coping with stress is 91.1% (Table 1).

Figure 1. Visuals of nine mural metacognition works

Table 1. Participants' socio-demographic characteristics and information on art (n=55)

Characteristics		n	%
Gender	Female	36	80.0
	Male	9	20.0
Department	Nursing	27	60.0
	Midwifery	5	11.1
	Physiotherapy and rehabilitation	7	15.6
	Nutrition and dietetics	6	13.3
Grade	Second grade	13	28.8
	Third grade	25	55.6
	Fourth grade	7	15.6
Academic Success	Good	18	40.0
	Middle	27	60.0
Income status	Income less than expenditure	15	33.3
	Income equals expenditure	19	42.2
	Income more than expenditure	11	24.5
Interest in art	Yes	14	31.1
	No	31	68.9
Interest in the art of painting	Yes	21	46.5
	No	5	11.4
	Partly	19	42.1
Having a talent for the art of painting	Yes	12	26.7
	No	13	28.9
	Partly	20	44.4
Receiving education in painting	Yes	6	13.3
	No	39	86.7
Thinking that painting is effective in coping with stress	Yes	41	91.1
	No	1	2.2
	Partly	3	6.7
Total		55	100

At the end of the research, nine mural drawing and painting studies were carried out. The mural works made at the end of the research application are in Image 1. The works were made by the students participating in the project.

The Beck Hopelessness Scale total score of the students was compared between pre-test ($\bar{X}$=4.06±3.81) and post-test ($\bar{X}$=3.77±3.47) scores (p=0.606). Three sub-dimensions of the social integration scale were analyzed. The pre-test ($\bar{X}$=27,91±6,92) and post-test ($\bar{X}$=27,73±7,42) scores of the total score of the social integration sub-dimension were compared (p=0,866). The pre-test ($\bar{X}$=15,71±3,72) and post-test ($\bar{X}$=15,91±4,02) scores of the students' local integration subscale total score was compared (p=0,716). Students' educational integration sub-dimension total score pre-test ($\bar{X}$=27,35±7,69) and post-test ($\bar{X}$=29,53±7,31) scores were compared (p=0,035) (Table 2).

Table 2. Participants' mean scores for the sub-dimensions of the BHS and SIS (n=55)

Scales and subscales	Mean± SS	t	p
BHS			
Pre-test	4.06±3.81	0.520	0.606
Post-test	3.77±3.47		
SIS-Social-environmental Integration Sub-dimension			
Pre-test	27.91±6.92	0.170	0.866
Post-test	27.73±7.42		
SIS, Local Integration Sub-dimension			
Pre-test	15.71±3.72	0.367	0.716
Post-test	15.91±4.02		
SIS, Educational Integration Sub-dimension			
Pre-test	27.35±7.69	2.170	0.035
Post-test	29.53±7.31		

BHS: Beck Hopelessness Scale, **SIS**: Social Integration Scale

When examining Table 2, these results indicate a statistically significant improvement in participants' adaptation levels related to the intervention, while no notable change was observed in the other sub-dimensions.

Discussion

Within the scope of this research, it was tried to provide an evidence-based practice in the field of health sciences of mural artistic activities. In a qualitative social integration study conducted on university students, it was suggested that programmes that increase social integration in schools should be carried out. In the same study, it was stated that there were no interventional studies on social integration (Akşab, 2018). This study is important in terms of supporting this aspect of the literature. Artistic activities to be started at the undergraduate level can be used as a coping method for busy healthcare professionals. In a study conducted by Kilic (2018), it was found that the level of social integration was higher at the undergraduate level compared to other education levels. In our study, we tried to benefit from this advantage of undergraduate students and to facilitate the transition to professional life.

The most striking result of this study was that the total score of the educational integration sub-dimension of the students showed a significant increase in the post-test score compared to the pre-test score (p<0.05). In the study evaluating the total social integration scale, it was found that women had a lower level of social integration than men (Kilic, 2018). In the literature, the opposite interpretation of this study is found in the sub-dimensions of the scale. In one study, it was found that students' social integration levels were directly proportional to the quality of education and academic achievement. In the same study, it was found that students' perceptions of educational and local integration were low, and the difference was in favour of male students (Ozgan ve Is, 2017). In our study sample, 80 per cent of the participants were women. This may be the reason for the difference in our study. In another study, the educational dimension was also found to be lower than in our study. The reason was interpreted as the school being inadequate in meeting student expectations, supporting students in showing their talents, and helping them solve problems (Simsek & Simsek, 2013). In our study, this situation can be considered as the opposite. With this study, the school gave students the opportunity to show their talents. It can be concluded that students are valued, pragmatic attempts are made to produce solutions to students' problems, and it is an example to support students in showing their talents. In this study, the null hypothesis H1d was accepted. Hypotheses H1a, H1b, and H1c are rejected.

Another striking finding in our study was the level of hopelessness. Demir-Barutcu (2023) evaluated the level of hopelessness as low (8.41±5.22) in a study they conducted with the students of the faculty of health sciences. In the same study, it was interpreted that the reason why this rate was lower in nursing students compared to other departments was that the anxiety of finding a job in the future was less compared to other departments. In our study, the rate of hopelessness was found to be almost half as low as in this study. In our study, more than half of the participants were nursing students (60%). The low level of hopelessness can be interpreted in this way. In addition, in another study, the factors affecting the hopelessness levels of nursing students were examined, and it was concluded that the level of

hopelessness was higher in women than in men (Cunkus et al., 2021). On the other hand, there are studies in the literature that found a level of hopelessness similar to our study (Tercanlı & Demir, 2012).

The current study does not directly measure metacognition. In one study, a three-session museum visit was carried out for nursing students as a visual art activity. Differently, the study does directly measure metacognition (Lovell et al., 2021). Studies arguing that metacognition is an important critical thinking tool in the field of art engineering and among doctoral students have been brought up in the current literature. Health is one of the fields where critical thinking is most needed. It may also be important for health professionals to think critically (Caratozzolo, 2022; Liu, 2023). Metacognitive change in visual art practices should be studied and emphasized more frequently in the current literature.

Finally, the mural activity in our study decreased the hopelessness level of the students, although not at a significant level. When the Beck Hopelessness Scale total score of the students was compared, there was no significant difference between the pre-test and post-test scores ($p > 0.05$). Although not significant, the decrease in hopelessness level is very valuable. In a study, it was emphasized that environmental stressors should be taken under control for nursing students to cope with hopelessness. It was also emphasized that the most important environmental support is social support. It was suggested that social opportunities should be created for students to spend time and communicate with their peers (Cunkus et al., 2021). It is predicted that our study will provide important findings for future studies in terms of being an initiative that deals with hopelessness and social integration together and includes a social and artistic initiative, just as stated in the literature.

Conclusion

At the end of the research, nine mural drawing and painting studies were carried out. There was a decrease in the hopelessness levels of the students, but not at a significant level. The environmental integration and local integration levels of the students did not change, and the educational integration levels increased significantly. Mural activity decreased students' hopelessness levels and contributed positively to their educational integration levels.

We invite those working in the field of art to help us use art as a tool to solve social problems and to participate in interdisciplinary work.

Recommendations

The effect of art on health can be used more as an evidence-based practice in future studies. Especially for nurses who have to work under an intensive care load, art activities can be used as a coping mechanism. The activities that start in the student period can ensure that the process is reflected in the clinics and care processes. Also, metacognition can be used as a basic parameter in future mural academic studies on visual art. For this, the Metacognitive Awareness Inventory could be a good measurement tool (Schraw & Dennison, 1994). New current scale validity and reliability analyses can also be performed.

Limitations of Study

The biggest limitation of this study is that it is single-centred. The results can only be generalized to this sample. The number of participants is limited. The reason for limiting the mural activities to 55 participants is that the activities made by the participants are costly, and the project budget is limited. The current study does not directly measure metacognition. The main reason for this is to limit the number of items in the questionnaire so as not to tire the participants.

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research was approved by the Tokat Gaziosmanpaşa University Social and Humanities Research Ethics Committee with the decision numbered E-33490967-044-175362 and dated 17.06.2022.

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Research Article

Gateshead′s identity, the relationship of the "Angel of The North" sculpture with the region and its impact on regional change

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Article Info	Abstract
   	This study aims to investigate the process of identity formation and symbolization of the "Angel of the North" sculpture, a public artwork, and its effects on the region. The Angel of the North sculpture by sculptor Antony Gormley has served as a catalyst for the cultural regeneration of Gateshead, England. Like the statue of "Liberty", which is part of the identity of New York City, and "Christ the Redeemer", the symbol of Rio de Janeiro, the Angel has become a symbol of Gateshead and one of the most talked about sculptures in the world. Such artworks created in cities are transformers of space that occupy their surroundings, transforming and interacting the society both culturally and economically. The purpose of artistic forms that affect the imagination of the society is to activate the space as well as to ensure the continuity of sensory sensation. In order for artificial components, which have an important role in the identity formation of cities, to be in harmony with the natural structure, it is important that they establish a connection with the cultural and historical past of the environment, for example; it is important that a sculpture is inspired by that region in order to be inscribed in the history of that city and also to be internalized and understood by the people of the region. The Angel of the North has also established a historical and cultural connection with its surroundings and has become a work of art that can be taken as an example to discuss the contribution of a sculpture to its surroundings in creating a city identity. The sculpture aims to appreciate the services of miners in the area, which was used as a coal mine for many years and then abandoned, to represent the transition from the industrial age to the information age and to be a focal point for hopes. In cities, a work of art designed in harmony with its surroundings creates meanings and memories for people, affects the concept of urban identity in social, cultural and economic terms, and creates a difference in the degree of recall with its distinctive features, and places with character like people are needed.

To cite this article

Introduction

Just like in ancient cities, in today′s cities, one of the distinguishing features of places where artificial elements are public spaces where people can express themselves, where a sense of individual and collective belonging develops and which are the source of urban memory formation is the monument or sculpture areas located in city squares or important points of the city. Therefore, sculptures, like architectural structures, are among the most important elements necessary for

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cities to take on character. Such structures also give the city an advantage over other cities in terms of recognition and recognition. Today, cities undergoing urban renewal face the danger of weakening collective memory. For this problem, experts argue that regeneration should be thought and developed together with the elements that make up the city identity. Art forms, which are among the most important of these elements, are thought to have an effective role in the development processes of society and in the renewed areas of cities. Despite the phenomenon of globalization, societies should be aware of the importance of their own culture and the role of their own art forms in renewal. This determines the importance of cultural accumulation and past memory as an indispensable reference area for societies.

Especially after the 1980s, public space forms have witnessed a renaissance. Increasingly, regeneration and development around the world are being used and perceived as part of public spaces (Corbett, 2004). The social spaces we use and pass through daily are part of our reality where we intersect with others. Spatial behaviors, which are an integral part of us, are defined by and define spaces. We therefore perceive space and spatial relations as we do other ways of living in society. The truth is that what can be said about our cities is that their spaces are made up of a collection of objects and people. These spaces and objects contain meanings created by people. The physical presence of roads and buildings does not make them meaningful; it is people's attribution of meanings and symbols to these objects beyond their actual function that gives them place identity and makes them part of real life (Madanipour, 1999). Place identity is strongly associated with a sense of belonging and is an important dimension of cultural and social life in urban areas. It is thought that humans psychologically strive to develop a sense of connectedness to a place in relation to the environment. The effort to establish an emotional and cognitive connection with a place strengthens the sense of belonging and guarantees safety with the commonality of the community (Kaymaz, 2013). Cities, where culture is shaped and continues, find the opportunity to develop and renew themselves through art. Therefore, cities actually reflect the people living in them like a mirror and resemble the people living there. One of the important functions of cities is to have spaces that will ensure the continuity of cultural memory and the expression of art through artistic elements. While public spaces create suitable grounds for art and artists, art will need cities and cities will need art for the development and continuation of cities (Akengin, 2021). Art is one of the most important factors for innovation and cultural identity in cities. Artistic spaces are seen as spaces that nurture social communication, offer creative ideas and provide social integration for a knowledge-oriented society. In cities that want to develop, it is also very important for contemporary art forms to meet with society in public spaces and contribute to society. New urban projects, which aim to develop economically and become a center, increase the density of the population and increase the interest of cities in artistic activities. In addition, artistic practices that emphasize the human-environment relationship have a positive impact on environmental awareness. It is seen that people who spend time in the artworks created in public spaces are happier and more peaceful. Due to the visual aesthetics in these places, public communication increases and psychological relaxation occurs. It will cause the art that meets with the masses in open spaces to spread socially and increase the number of institutions and organizations that contribute to the development of the cultural fabric of the city (Parlakkalay, 2020).

Method

In the research, the visuals of the "angel of the north" in the public open space and the evaluations regarding the bond it establishes with its surroundings were utilized. Academic articles, books and discussions on the socio-economic and cultural structure of the region, urban distribution and the impact of social transformation on the public system were examined. Published articles and news about the history, construction process and reflections of the "Angel of the North" sculpture in the region were analyzed. The study also considers open space sculptures as artistic constructions that encompass sociological transformations and public fabric inspired by cultural symbols of urban memory. In this context, British sculptor Anthony Gormley's sculpture, Angel of the North, which will intuitively respond to the unique history of Gateshead and northern England, which won the Turner Prize, Britain's highest contemporary art prize, was investigated. Qualitative research method was used, reliable sources were reviewed and reported. Document analysis was

used as a qualitative method in the research. With this method, the research was tried to be supported on the basis of scientific ethical principles.

Findings

Art in Public Space

Public space is defined as open spaces belonging to every individual of the society, which develops from the free mind and thought of human beings and where freedoms can be freely used and practiced in accordance with the laws (Demir & Sesli, 2007). Although there is variability in the definition of public space in different disciplines, it is generally expressed as areas where citizens have individual common rights in the relations between people and space and where every individual can easily access (Mehta, 2014; Meral & Çelen Öztürk, 2023). In this process, the artist who will create artistic applications for public spaces focuses on the history, culture and natural structure of that place and produces the work of art by taking these values into account (Yılmaz, 2018). Artistic structures in the public space make the conditions and possibilities more livable for people together with their surroundings. The artwork that makes its presence felt in the city finds the opportunity to spread beyond its borders. It will only be possible for people living in the city to leave the unconscious mass and gain cultural accumulation and development through art (Çakar, 2016). While showing the definition of the public space through art, it protects the city with all its power against deterioration and damage by mobilizing people's emotions in order not to spoil its nature. It becomes a preventive force against the pressures of modern thought as well as historical areas (Verlag, 1997; Shahhosseini, 2015). Consciously designed and created sculpture in urban areas has important aspects such as changing people's perspective, providing cultural interaction, playing the role of uniting and integrating people with each other, creating an aesthetic and more livable environment (Kurtaslan, 2005). Public sculptures are important physical elements for urban landscape designers to support the thoughts and ideas of the society. Feeding these sculptures from different perspectives and ideas will benefit cities in terms of supporting social manifestation. Sculptures or artistic structures made with this idea in mind mean that human values are cared for and kept alive. For the orientation of the society towards modern art, the importance of memories, social values and beliefs leads to positive results in society. Art in public perception should be considered as a part of modernization in general. It should present the identity of the society as modernity associated with traditional values (Shahhosseini, 2015). Sculptures placed in urban areas form a part of the collective memory of the past and the future. Artistic structures built in the public space, which include various concepts, emphasize the sense of identity-identity and contribute to the continuity of cultural values (Özkul & Küçükşen Öner, 2021). Sculptures made in public spaces are talked about in society and become remarkable. In a study, it was concluded that sculptures and artistic practices in public space created awareness beyond expectations in various age and class groups; however, a longer period of time is required for the development of sustainable attitudes (Bailey et al, 2004). We should not only look at sculptures as remarkable structures with their physical appearance in cities; they also have the ability to change the region where they are located, add meaning, communicate with their surroundings, affect people's lives, and have educational and instructive features (Bulat & Bulat, 2021).

City Identity

One of the negative effects of globalization on cities is the gradual loss of their historical identity. Mostly historical places in cities contribute significantly to the concept of place identity. Cities are places that live as a whole with their natural structure and artificially created spaces. Among the important determinants of urban identity are historical sites, archaeological sites, original and traditional settlements, as well as abstract values and spiritual values of that place and images formed in people's minds (Perihan & Aşur, 2020). Buttimer; "City symbols play an important role in the socialization process. It brings a sense of familiarity and safety to the environment" (Fırat, 2002; Meral & Çelen Öztürk, 2023). Place is defined as something occupying a space or a part of a space. One of the most important artistic structures that contribute to the recognition and recognition of cities is sculptures that are place markers and symbols. Urban sculptures add spirit to the place where they are located and develop a sense of place and belonging. Sculptures that are in harmony with their surroundings are elements that visually support the integrity of the environment, create a sense

of place in people and develop a sense of comfort. Urban identity is an important part of contemporary structuring. Identity represents certain boundaries in the city and the individual who uses these boundaries creates a distinctive personality space. Therefore, it can be said that sculptures with unique artistic designs will make significant contributions to the formation of the identity of cities (Shahhosseini, 2015). Reaching an international value in the formation of local and regional identity is an important factor for cultural-oriented renewal and a successful outcome. One of the important points here is to add something to cultural assets instead of taking something away from them (Bailey et al, 2004). The contribution of art is very important in creating cultural identity and strengthening social communication, and it reveals the commonalities of different ideas (Bastaban, 2024).

History of the City of Gateshead

Gateshead is a town on the south bank of the River Tyne in Tyne and Wear, England. For a long time, Gateshead has been an industrial town in its own right with a rich and proud history. It was first settled along the River Tyne at the site of the current Tyne and Swing bridges. In the 1300s it was known for coal mining and was an important place where docks were built to transport the coal across the river. In the 1600s the town declined due to civil war and the rich coal deposits were left behind in hard-to-reach areas. Later, with the development of technology, the coal mines were reused and the town became prosperous again. Coal mining also influenced and led to the development of other industries such as shipbuilding, pottery, iron and brick making and chemical factories. With the impact of these developments, the population of the town increased significantly in the 1800s and caused the people to live in unhealthy areas. People living under poor conditions, for example, faced sad consequences in the cholera epidemic (Neave, 2012).

Figure 1. 244-252 High Street, Gateshead, Photographer: Dodds Edwin, 1886

During this turbulent period, the working classes of society suffered the most severe deprivations (Mackenzie, 1827, p:81). In the 1860s, land was expropriated from both the south and north for housing construction and the city's built-up area gradually expanded. In 1909 the Housing Act led to the clearance of nightshanty areas, which were converted into housing estates for the wealthy. In the 1920s Gateshead's heavy industry declined and failed. In the 1930s steps were taken to improve the town with the establishment of the Team Valley Trading Estate. The closure of the mines for political reasons during World War II led to increased unemployment and a gradual decline in the population (Neave, 2012).

Figure 2. View of Gateshead Dock from High Level Bridge, 1925

The construction of the Metro Center in 1986 and the start of the National Garden Festival in 1990 increased development in the city, and more recent structures such as the Millennium Bridge and the statue of the Angel of the North have led to increased urban pride (Neave, 2012).

The Story of the Angel of the North

The city council decided to build a landmark to promote the city of Gateshead as a solution to culture-led urban regeneration. The city council commissioned British sculptor Anthony Gormley, winner of the Turner Prize, Britain's highest contemporary art prize at the time. Upon receiving the commission, Gormley conducted extensive research into the local area and felt that the 'Angel' sculpture would intuitively respond to the unique history of Gateshead and the north of England. Aware that coal miners worked for hours in the dark beneath this site, Gormley wanted his angel to act as a meaningful reminder of their steadfast endurance, creating what he called a "poetic echo". "The angel resists post-industrial amnesia and bears witness to the hundreds and thousands of miners who have spent the last three hundred years mining coal beneath the surface," Gormley said. Gormley used corten steel with a rust-red exterior to associate the Angel of the North with the land where coal mines once stood. It is also a reference to steel itself and its labor, once the most important industrial resource in the north of England. Initially, the design of the sculpture was not liked because it reminded the Nazis of their favorite works of art, and petitions were made to cancel its construction due to lightning strikes, interference with television signals, the possibility of traffic accidents, and the high cost. After long negotiations, Gormley designed this sculpture that reflects the history of the town and at the same time looks to the future. As you cross the A1 national highway from London to northern Scotland, you can see the huge statue of the "Angel of the North", the symbol of northern England. This huge steel sculpture in the shape of a winged human (angel) is a public artwork erected in Gateshead in 1998 by artist Antony Gormley (Lesso, 2022).

Figure 3. Antony Gormley, Angel of the North, 1998, Gateshead, via PM Today

Open space sculptures are mostly artistic structures that cover sociological transformations and public fabric inspired by cultural symbols of urban memory (Oto, 2024). The presence of a sculpture designed in the right place to create

special meanings and beautiful memories for people is important for urban life. Urban sculptures should have features that can meet the principles and principles of art in terms of visual and aesthetic values suitable for the cultural environment (Meral & Çelen Öztürk, 2023). Urban sculptures can sometimes appear as a symbol. Symbol sculptures usually dominate their surroundings with their large size. Therefore, they can also exist as an important point as signs that can be used in all directions. Such marker sculptures or artistic constructions also become permanent as unique and unforgettable memories and reminders for people. If things that are symbols have a distinctive form that affects their space, they are remarkable as places that are recognized and known (Lynch, 1960; Shahhosseini, 2015).
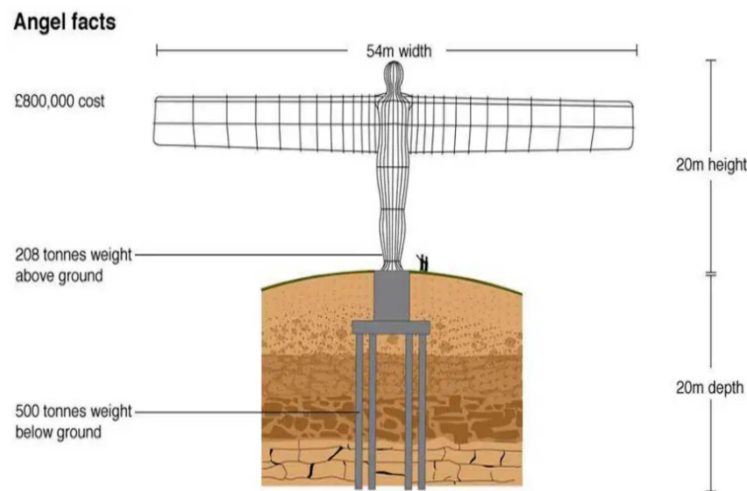
Figure 4. Antony Gormley's Angel of the North site plan, via Gateshead Council

Twenty-two (22) meters high, with a wingspan of 54 meters and weighing 208 tons, the sculpture is made of corten steel. It is often cited as an example of the positive function of public art. It is said that millions of tourists visit the sculpture every year to see its splendor. Costing around £800,000 (equivalent to around £1,780,000 in 2023), it has become a landmark in north-east England and Gateshead, an icon of England. The Angel of the North is a symbol of the desire to revitalize the area and is now considered one of the most successful public art projects in the UK (Lesso, 2022).

The Angel of the North sculpture was developed from Gormley's "A Case for an Angel" sculpture series, which he began producing in 1989. For the first model sculpture, Gormley used a mold of his own body. The original sculpture was made of corten steel, a material that does not need painting or maintenance, and is resistant to natural factors with a rust-colored layer that fixes the surface of steel indefinitely, thus achieving a more industrial appearance. When you enter Gateshead from the south, the statue welcomes you with open arms as if inviting you. When you look at the statue from the north, it looks like an angel with outstretched wings protecting the land from the enemy. The hill on which the statue stands is similar to the hill on which the Norman castle stands, 17 kilometers away, which reinforces the sense of protection. And the fact that this mound is in the area where the mines used to be located has created a strong connection with the past. In order to place the sculpture in the former mining area, an area of about 100 square meters was filled and the 5.3-meter-high concrete base was reinforced with 20-meter steel-reinforced piles (Nicholson, 2018).

Figure 5. Antony Gormley with the head of the Angel of the North, 1998, via Chronicle Live
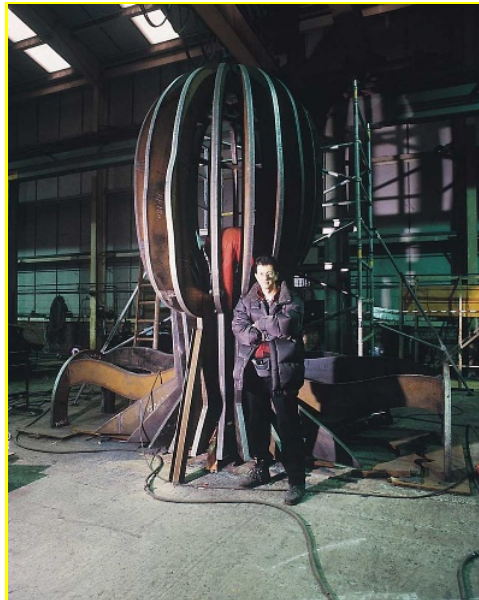
It should be noted that it is possible that the renewal of cities under the leadership of culture, together with local conditions, will make an exemplary difference. This is because Gateshead stands as the best example both in the world and in Europe where the contribution of arts and cultural regeneration to cities is clearly visible. The lesson here is how the conditions for achieving this developed and how it was achieved. Peter Palumbo, then the city council's director for the arts, stated that a festival would be organized in a different city and in a different art form every year for a period of 10 years. The northern region's visual artists, who were able to operate in the LADA network, had a distribution system that they could utilize powerfully. The presence of small galleries in the region at this time, its reputation for art in the public realm, and the implementation of one of the boldest projects to date, the Angel of the North sculpture on the A1 motorway, was an important turning point for Gateshead. The sculpture is a testament to the success of Gateshead Town Council and a reassurance of what funders can do. It is quite unique to achieve such successes with regional and local means. The impact of such work on cultural globalization needs to be discussed. We need to look closely at the achievements of these pioneers of cultural regeneration in the north east, not forgetting that these are the kinds of developments that could not have been achieved without the mindset shifts symbolized by the Year of Visual Arts in Gateshead (Bailey et al, 2004).

Figure 6. Angel of the North under construction in 1998, via Chronicle Live

Urban designers and planners can guide people towards a meaningful environment. Urban planners should not ignore informing people about the characteristics of the environment and how to use it more effectively. Human values should be the primary aim of all designers for a successful environmental design. Therefore, the first thing an urban designer should know is the social life of people, their beliefs, their values, what they like and celebrate; these important

things are related to the cultural, historical and symbolic meanings of urban spaces (Bahraini, 2008; Shahhosseini, 2015). The most important feature of an outdoor sculpture is that it is displayed outside an exhibition hall and people can pass by and see it in their routine daily lives, for example, on their way to school or work. In this way, the sculpture has played an active role in conveying the desired message while creating awareness by communicating with the society. Due to the opportunity to easily access and touch outdoor sculptures, the bond and communication between art and people has strengthened (Armağan Benek, 2023).
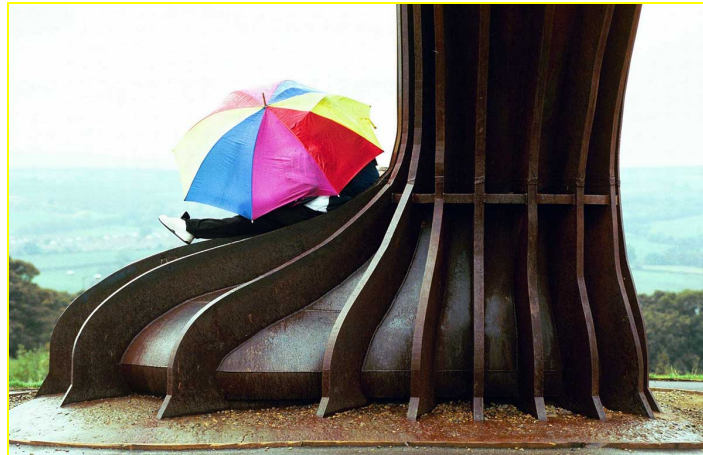
Figure 7. Visitors at the foot of Melek, via Chronicle Live

Creating the new by adopting the cultural richness of the society is one of the duties of art. The dynamic perceptions that pass through life are constantly focused on discussion and reflection in public spaces. This dialectical interaction develops the formal and intellectual side of sculpture. Sculptures that become symbolic in this way also perpetuate a flow of human knowledge and contribute to the progress of society. Artistic actions always appear as a developing and unifying force in societies (Yağmur, 2018).

Figure 8. Objects hung on the trees around the statue

The Angel quickly became a major tourist attraction and marked Gateshead's place on the map. Flowers, painted stones, signs, messages and poems have been hung by visitors on the tree branches around the statue, often in memory of loved ones, and almost everywhere else. Clearly, the Angel seems to have entered the hearts and minds of the local people. The statue is often surrounded by people climbing up to its feet, taking photographs, children chasing each other around it and couples holding hands (The Garden Trust, 2023).

Conclusion and Discussion

Artificial and natural areas formed by the harmonious unity of urban areas with all their elements can give a city a distinctive identity that distinguishes it from other cities. One of the most important structures that contribute to the formation of a city's identity is artistic formations, the most prominent of which are sculptures. While artistic designs offer an innovative approach to cities, they influence citizens to develop new concepts in uniquely designed spaces. Since ancient times, sculptures in cities have been seen as important reminders and signaling symbols for cities. Based on these past experiences, it is also important for artists to adopt a participatory model that develops a culture of design and thought-provoking new experiences. In our modern age, there are many cities where sculptures are at the forefront in the identity formation of cities, and there are even many cities known for sculptures. The most important of these are the statue of "Liberty", which is part of the identity of New York City, and the statue of "Christ the Redeemer", the symbol of the city of Rio de Janeiro. When artists and designers create artworks or public spaces that care about the culture and values of the people living in cities, they are also investing in the sustainability of values. For example, sculptures in open spaces can play an important role in creating both tangible and intangible values by linking cultural values, historical past and modernity in today's societies. A well-planned and constructed sculpture in a public space has a great visual impact to reveal the hidden identity of a place and a community. In addition, we can see how such important works of art have an economic impact on the region where they are located, create areas of attraction and contribute to tourism from case studies in many places around the world. The Angel of the North, which is the subject of this research, has created an artistic scene beyond its iconic features and has shown that it can transform the region. The sculpture acted as a key to unlocking the potential of Gateshead, as a precursor to some other artistic activities. It is also important that cities are expressed and commemorated through images, and that the sociological impact of relationships with places is important, markable and recognizable to people. It is concluded that sculpture applications in urban space planning can affect and transform elements of many different qualities. As a result, the effect of a sculpture on the city is seen very clearly in the example of the "Angel of the North", which has become the symbol of Gateshead.

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Assist. Prof. Dr., **Muhammet Hanifi Zengin,** He graduated from Atatürk University, Faculty of Fine Arts, Department of Sculpture, in 2002-007. In 2011, he completed his master's degree in Atatürk University, Social Sciences Institute, Department of Sculpture. He graduated from Atatürk University Fine Arts Institute Plastic Arts Proficiency Program in 2022. He continues his artistic activities and academic studies as a faculty member at Kafkas University.

Current Exhibitions and Awards Received by The Artist

Solo Exhıbıtıons: 2023, "Memories and Stones", Kafkas University Congress and Culture Center – Kars.

2024, "On The Trail of the Past", Kafkas University Congress and Culture Center – Kars.

Current Exhibitions and Awards Received by The Artist

2025, "Erciyes Snow Sculpture Symposium", Kayseri. 2024 "Terrace Exhibition On the Trail of a Thought" 16th Terrace Exhibition, Elgiz Museum, Istanbul, 202., "Her Şeye Rağmen" 12. Teras Sergisi, Elgiz Müzesi, İstanbul. 2019, Is There Life on Earth? 11th Terrace Exhibition, Elgiz Museum, Istanbul.

Awards: . 2021,75th State Painting and Sculpture Competition, Success Award. 2016, "Yunus Emre Memorial Sculpture" Honorable Mention Award. 2016, "Mailart Mail Art Competition", Honor Award, 2018. "Foundation Participation Birdhouses Design Competition" Special Jury Award. **E-mail**: muhammethanzengin@hotmail.com

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Visual Resources

Figure 1,2. http://www.gatesheadhistory.com/construction.html

Figure 3,4,5,6,7. https://www.thecollector.com/why-was-the-angel-of-the-north-built/

Figure 8. https://thegardenstrust.blog/2023/10/14/the-angel-of-the-north/

Research Article

Integration of design and entrepreneurship: a proposal for innovative educational models

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Article Info	Abstract
	This study examines the integration of design and entrepreneurship education, highlighting its role in enhancing creativity, fostering innovation, and bridging academic learning with real-world application. Design education focuses on user-centered approaches, aesthetics, and functionality, while entrepreneurship translates creative solutions into market-ready outcomes. The study showcases how merging these disciplines prepares students for leadership roles and equips them to address socio-economic challenges. Based on a doctoral dissertation, the research presents the "Design and Entrepreneurship" course, implemented for three years at Istanbul Yeni Yüzyıl University's Fine Arts Faculty Graphic Design Department. The 16-week curriculum develops entrepreneurial skills such as problem identification, business model creation, SWOT analysis, customer profiling, and moodboard preparation, all integrated with design principles. The model emphasizes iterative processes like prototyping, testing, and feedback. Using a case study approach, data from surveys, chronological records, and classroom observations were analyzed. The results indicate that this interdisciplinary approach enhances creative and entrepreneurial competencies, fostering innovative, market-oriented solutions. Applied learning environments proved effective in promoting collaboration and equipping students with practical industry skills. The study underscores the importance of integrating entrepreneurship into design curricula to meet industry demands, enabling students to merge creativity with business acumen. It advocates for adapting this model across various art and design disciplines, fostering innovation and bridging gaps between theory and practice. The model's three-year sustainability demonstrates its scalability for professional success. In summary, integrating design and entrepreneurship education offers a transformative framework that prepares students to address both creative and socio-economic challenges, providing a solid foundation for interdisciplinary curriculum development.

To cite this article

Introduction

Design and entrepreneurship are two fundamental disciplines that enable the transformation of creative ideas into economic and social value. While design provides problem-solving and innovation-oriented approaches, entrepreneurship focuses on implementing these ideas and creating sustainable value. The integration of these disciplines into higher education curricula ensures the development of qualified individuals who can meet the evolving demands of creative industries.

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This study examines the integration of design and entrepreneurship education within the framework of the Triple-Helix Model. To foster entrepreneurship and project development, the traditional Entrepreneurial University concept, which initially emphasized university-industry collaboration, has been expanded with the inclusion of the government sector, introducing a new model to the literature known as the Triple-Helix Model. This model represents the collaboration and integration between universities, the government, and industry. In this model, universities provide knowledge and technological advancements, governments offer legal and financial support, and industries define and implement market demands. By fostering synergy among these three pillars, the model supports innovation and entrepreneurship by facilitating the efficient execution of collaborative initiatives.

According to Henry Etzkowitz, "*The university-industry-government relationship consists of overlapping institutional spheres that assume each other's roles while remaining relatively independent yet interdependent*" (Etzkowitz, 2002:2). By incorporating the university into the public-private relationship, this structure adds academic value, supporting the transition from an industrial society to a knowledge society. As Kiper notes, "*Unlike the linear innovation model, this structure represents institutional relations focused on innovation among the public, private sector, and academia, organizing these relations at different levels and explaining the use of knowledge as capital within a triple-helix structure*" (Kiper, 2010:31).

The Triple-Helix Model provides a robust framework for teaching design and entrepreneurship simultaneously. However, current curricula often treat these fields separately, particularly in arts and design programs, where entrepreneurship education is insufficiently integrated. This separation prevents students from acquiring the entrepreneurial competencies necessary to bring their creative ideas to market and develop sustainable projects.

The primary objective of this research is to introduce and evaluate an innovative curriculum model that combines design and entrepreneurship. The study presents a practical framework for incorporating entrepreneurial strategies into design education to support students in developing more analytical and sustainable solutions during their project production processes. The proposed model, which is exemplified through the "Design and Entrepreneurship" course conducted for three years at Istanbul Yeni Yüzyıl University, demonstrates how the integration of these disciplines equips students with competencies such as problem identification, business model development, SWOT analysis, and customer profiling.

The significance of this research lies in its contribution to both academic theory and practical application. It addresses a crucial gap in the existing literature by proposing an interdisciplinary approach that aligns with real-world needs and challenges. By embedding entrepreneurial thinking into design education, the proposed model enhances students' problem-solving abilities and prepares them for leadership roles in creative industries. In this context, Balaban and Özdemir (2008) emphasize the role of education in fostering entrepreneurship as follows: "*Entrepreneurship is one of the fundamental factors that emerge during the transition from an industrial society to a knowledge society and determines economic development. For a country to achieve growth and progress, it must foster entrepreneurs who can create economic value and adapt to rapidly changing conditions. In this context, education is considered one of the most critical factors in uncovering entrepreneurial potential. The purpose of entrepreneurship education is to help individuals discover and become aware of their latent entrepreneurial characteristics.*" (Balaban & Özdemir, 2008:133).

Therefore, the integration of design and entrepreneurship aims not only to train designers capable of creating aesthetically pleasing and functional solutions but also to cultivate individuals who can generate social and economic value. By encouraging interdisciplinary collaboration and applied learning, this study aims to provide a roadmap for fostering innovation and entrepreneurship in creative industries through academic programs.

In summary, this study highlights the importance of interdisciplinary collaboration by examining the relationship between design and entrepreneurship within the context of the Triple-Helix Model. The proposed educational model underscores the necessity of equipping students with both creative and entrepreneurial competencies, enabling them to excel in design projects and emerge as leaders in the competitive landscape of the business world.

Research Problem

Design and entrepreneurship education are often treated as separate disciplines and conducted within independent curricula. This situation creates a gap between creative thinking skills and the capacity to develop innovative solutions applicable in the business world. Individuals aiming to work in creative industries are expected to possess both design-oriented problem-solving abilities and the capability to commercialize these solutions. However, current educational models do not sufficiently support the simultaneous development of these two competencies. As a result, curricula that do not integrate design and entrepreneurship limit students' capacity to succeed in the business world and create innovative products. This study arises from the need to develop a model that addresses this deficiency.

Method

Research Model

The research was designed to evaluate the effectiveness of the proposed "Design and Entrepreneurship" course in developing students' creative and entrepreneurial competencies. The course was implemented over three years and analyzed through surveys, classroom observations, and chronological records. The research is structured around a case study model to provide an in-depth exploration of the interdisciplinary curriculum. Case studies are particularly effective in capturing detailed insights into educational interventions and their impact, making this approach suitable for assessing the application and outcomes of the course.

Participants

The participants of this study included fourth-year undergraduate students enrolled in the "Design and Entrepreneurship" course at Istanbul Yeni Yüzyıl University's Department of Graphic Design. Over the three-year implementation period, a total of 120 students participated. The participants were selected as they represented a relevant cohort actively engaging in creative problem-solving and entrepreneurship within their academic studies.

Relevant course documents, such as syllabi, lesson plans, and student project submissions, were also analyzed to support the study. Additionally, feedback from students in the form of surveys and presentations served as critical data sources.

Data Collection Tools

Pre-course and post-course surveys were administered to measure students' perceptions of their entrepreneurial skills and creative competencies. Detailed observational notes were taken during each course session to monitor students' engagement and participation in course activities. Records of student progress throughout the 16-week course were maintained to document milestones, challenges, and accomplishments during the project development process.

Data Analysis

Data collected from surveys were analyzed using descriptive analysis to identify trends and changes in student responses. Quantitative data were tabulated and interpreted to highlight any improvements in students' entrepreneurial knowledge and skills.

Qualitative data from classroom observations and student submissions were subjected to content analysis. Thematic coding was used to identify recurring themes, such as problem identification, creativity in solutions, and proficiency in developing business models. The integration of qualitative and quantitative findings provided a comprehensive understanding of the course's impact.

Procedure

The process of this study is based on Dr. Duygu Sezgin's doctoral dissertation titled "Design Entrepreneurship in Turkey: A Proposed Design Technopark Model for Implementation at Mimar Sinan Fine Arts University" and the GRA 412 Design and Entrepreneurship course, which has been conducted with senior-year graphic design students for three years. The course is structured as a 16-week program designed to equip students with entrepreneurial skills by integrating design-oriented problem-solving processes with business development strategies.

The first phase of the 16-week course begins with an introduction to entrepreneurship concepts and encourages students to identify a problem related to their field of study and develop innovative solutions for it. Throughout the

semester, students work on essential components such as business model canvases, SWOT analyses, and customer profiling. The midterm assessment evaluates their progress based on the submission of these components.

After the midterm, topics such as social entrepreneurship, revenue models, investor preparation, and branding strategies are covered. The final weeks are dedicated to project completion and presentation rehearsals. The semester concludes with a final exam, during which students present their projects in a jury format simulating an investor pitch. This comprehensive process ensures that students gain both theoretical knowledge and practical experience in entrepreneurship.

Ethics

This study was conducted in accordance with ethical principles to ensure the integrity and transparency of the research process. Participation was based on voluntary consent, and students were thoroughly informed throughout all stages of the research. During the data collection and analysis phases, students' anonymity and confidentiality were strictly maintained, and the collected data were used solely for academic purposes. No personal or sensitive data that could identify participants were collected, and the intellectual property rights of student projects were protected. All feedback was provided objectively and constructively. The research process was carried out with respect for participants' rights and within a transparent and supportive environment.

Findings

Design and Entrepreneurship: Conceptual Connections

In this section, the concepts of design and entrepreneurship are defined under specific subheadings, focusing on their foundational elements. These subheadings include the definitions of design and entrepreneurship, providing a clear understanding of each concept. Additionally, the educational processes related to both fields are discussed in detail under their respective subtopics.

Furthermore, the section highlights the parallel aspects of design and entrepreneurship in a dedicated subheading, emphasizing their interconnectedness. The similarities between the two are explored to demonstrate how they complement and enhance each other.

The Concept of Design

Design is an interdisciplinary field that combines creativity and problem-solving skills to provide user-centered solutions. Since the Industrial Revolution, design has evolved from craftsmanship to an industrial approach and has come to play a fundamental role in today's creative industries. Kalay defines design as follows: *"Design is a process aimed at developing artificial objects or environments that meet specific goals within certain constraints. Since there is no formula that can consistently translate goals and constraints into coherent physical forms, design relies heavily on knowledge and experience, following an iterative trial-and-error process"* (Kalay, 1985, p. 320). Emre Becer (Becer, 1997) categorizes the steps to be followed in the design process as: *"problem definition, information gathering, creativity and invention process, solution finding, and implementation"* (p. 39).

The British Design Council, established in 1944, supports designs that aim to improve lives and emphasizes the importance of creating sensitive and sustainable designs. According to the council, the published double-diamond model and its main components are considered to best encapsulate the design process (British Design Council, 2004).
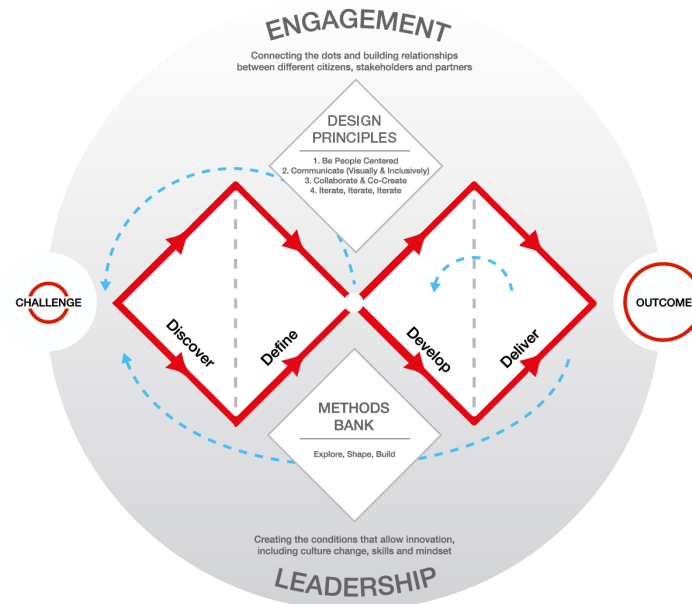
Figure 1. The Double Diamond model, developed by the Design Council (British Design Council, 2004)

According to the council, this process begins with an impetus or a challenge and progresses through various stages to reach completion. These stages are represented in a double-diamond model, consisting of four sections: Discover, Define, Develop, and Deliver. The explanations of these four stages are as follows:

Stage 1. Discover: This is the initial phase in which the designer understands and explores the problem, marking the start of the design process. In the case of an original design, this stage may involve personal exploration, whereas in commissioned design, it progresses based on the provided brief.

Stage 2. Define: In this phase, the designer identifies and defines the problem and works on crafting a solution. At this point, it can be said that the abstract realm of design begins to take tangible form.

Stage 3. Develop: This stage involves the generation of solutions, development of prototypes, testing of the product, or interaction of the design with the audience or user. Feedback gathered during this phase and the updates made based on this feedback are crucial for the success and sustainability of the design.

Stage 4. Deliver: This is the final stage where the design is completed, introduced to the end user, exhibited, or launched in the market (British Design Council, 2004).

Although the final stage is "Deliver," design is an ongoing process. The blue arrow pointing left between "Deliver" and "Develop" in the diagram illustrates this concept. Even a delivered and marketed design, despite being tested, may receive negative feedback from end users. In such cases, revisions can be made by returning to the "Develop" stage. A similar situation applies when implementing an entrepreneurial project.

Throughout these four stages, design principles are utilized. These principles prioritize the target audience-humans-emphasize collaborative production, and advocate for iterative revisions based on feedback to meet needs in the most accurate way possible. According to the council members, the principles a designer should adhere to are explained as follows:

Human-centered approach: Begin by understanding the people using a service, their needs, strengths, and desires.

Visual and inclusive communication: Help people gain a shared understanding of problems and ideas.

Co-creation: Collaborate and progress by drawing inspiration from the work of others.

Iteration: Identify errors early, mitigate risks, build confidence in your ideas, and repeat the process (British Design Council, 2004).

The methods to be applied in the design creation process are grouped under the "Method Bank" by the council, recommending the "Discover, Shape, and Build" approaches. Based on this diagram, the views of the council, and other definitions, the concept of design can be summarized as follows: "Design is a continuous, iterative process aimed at

solving the problems of the target audience in line with certain principles." Within this context, it is crucial to instill this perspective in design education.

Design Education

The period spanning from the late 1700s to the mid-1800s marked the advent of industrialization, with machinery increasingly entering daily life and ushering in the Industrial Revolution. This era caused a significant transformation in many fields, including classical art and the once-valued original handcrafted designs. Handicrafts and artisanal works lost their importance, giving way to mass-produced goods and initiating an era of serial production. Consequently, the value and pricing of art and design products shifted, leading to a systemic reevaluation.

The meaning of art and design began to change, prompting systematic inquiry. The Arts and Crafts movement, which emerged in the mid-1800s, reinstated the importance of craftsmanship and original design. This led to a reassessment of design education, followed by the establishment of fine arts schools in England. Originating in England, this movement eventually gained traction worldwide under various names. The Arts and Crafts movement, supported by The Studio magazine—a significant publication promoting international trends—had a profound influence on European art movements. While it was known as Arts and Crafts in England and America, it was referred to as Art Nouveau in France and Belgium, Jugendstil or Neue Kunst in Germany, Secessionstil in Austria, and Stil Floreale in Italy, all serving a common purpose.

The introduction of art and design as formal subjects in school curricula is closely tied to the Industrial Revolution, laying the foundation for integrating design production and education with industry. The Arts and Crafts movement, which originated as a distinctive style opposing industrialization, underwent a transformation with the establishment of the Bauhaus School in Germany in 1919. The Bauhaus introduced a new understanding that viewed machines as tools that could be utilized in artistic production. It is fair to assert that Bauhaus significantly influenced art education globally.

With advancements in technology and the invention of computers, traditional methods were augmented by digital techniques, fostering interdisciplinary studies. Alongside art and design schools, various universities established faculties dedicated to fields such as graphic design, industrial design, interior architecture, and stage-scenography design. These departments began offering specialized courses tailored to their respective disciplines. While this specialized focus is undoubtedly valuable, the purpose of this article is to propose an innovative model that incorporates entrepreneurship into design education and to emphasize the necessity of integrating the concept of entrepreneurship into design curricula.

Design education, unlike fields such as science and mathematics, lacks widespread standardization. However, the 2011 ICOGRADA[2] Design Education Manifesto established certain frameworks for this purpose. The manifesto, comprising contributions from various designers and educators, features a section titled "The Future of Design Education," which outlines nine key principles. Three of these principles are as follows:

Principle 3: Design education should present models for cross-cultural and interdisciplinary communication and global market collaboration between industries, users, other design disciplines, and stakeholders.

Principle 6: It should contribute new knowledge to interdisciplinary discourse and inspire professional practices.

Principle 9: It should instill personal responsibility in students regarding the environmental and societal impacts of their work (Icograda, 2012).

These principles advocating for the future of design education emphasize the importance of cross-cultural and interdisciplinary collaboration while asserting that projects should play a role in identifying and solving environmental issues.

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2 ICOGRADA: The International Council of Graphic Design Associations

The Concept of Entrepreneurship

Entrepreneurship can be defined as the process of transforming innovative ideas into economic or social value. This process emphasizes risk-taking, problem-solving, and sustainability. Entrepreneurship combines individual creativity with team collaboration to generate innovative solutions.

"The concept of entrepreneurship, in its current sense, is associated with the dominance of the capitalist mode of production. Its entry into economic literature also dates back to the 19th and 20th centuries. The term was introduced into economics by the French economist Cantillon" (Blinks & Vale, 1990: 119).

The table below presents definitions of entrepreneurship and entrepreneurs by researchers and practitioners who have studied and contributed to this field. By analyzing the commonalities among these quotations, the aim is to provide a comprehensive definition of entrepreneurship and the qualities of an entrepreneur.

Table 1. Chronological definitions of entrepreneurship and the entrepreneurial individual based on expert opinions

Name	Profession/Title	Year	Definition/Quotation
Richard Cantillon	Economist, Writer	1755	An entrepreneur is someone who buys or produces the inputs of production to sell them at an uncertain price. According to Cantillon, the main characteristic of entrepreneurs is living with an uncertain income (Cantillon, 1990).
J. Babtiste Say	Economist, Entrepreneur, Philosopher	1845	The concept of an entrepreneur is a person who brings together all factors of production to produce a good that is considered valuable and takes on the risk for the profit they will earn. Say's definition of an entrepreneur is based on having both the ability to take risks and managerial skills (Blinks & Vale, 1990).
Joseph Alois Schumpeter	Economist, Austrian Finance Minister (1919–1919)	1976	Entrepreneurship is one of the most important elements of the economy. The entrepreneur's main responsibility is to increase the welfare of society by introducing innovations in various types (Schumpeter, 1976).
Howard H. Stevenson

D. E. Gumbert | Rock Baker Foundation Honorary Professor, Harvard University

Economist, Writer | 1985 | The explanation of entrepreneurship involves stating that it is a characteristic present in some organizations or individuals, and absent in others; in other words, it is an all-or-nothing trait. This trait manifests itself in advancing the individual or business or seeking security (Stevenson & Gumbert, 1985). |
| Prof. Dr. A. Emre Demirci

Assoc. Prof. Dr. Mehmet Başar

Dr. Lecturer Burak Tuğberk Tosunoğlu | Academic, Anadolu University,

Academic, Anadolu University | 2001 | Behaviorally, the concept of entrepreneurship can be defined as the set of activities necessary to seize an opportunity, define a business idea, find the necessary resources, launch the initiative, and achieve results. There are four main components of entrepreneurial thinking: being innovative and creative, risk-taking, being a pioneer, and thinking competitively (Başar, Tosunoğlu, & Demirci, 2001). |
Prof. Dr. Murat Yalçıntaş	Academic, Former President of the Istanbul Chamber of Commerce	2010	Entrepreneurship is a dynamic process that includes vision, change, and creativity. It requires passion and energy, and the application of this energy is necessary to create and implement new ideas and constructive solutions (Yalçıntaş, 2010).
Prof. Dr. Engin Özgül	Academic, Department of Business Administration, Faculty of Economics and Administrative Sciences, Dokuz Eylül University	2019	To define a good entrepreneur in the shortest way, it is possible to say that it is a person who creates value for the stakeholders of the initiative by gathering the resources needed to produce a product or service in the way that creates the highest value. Therefore, the entrepreneur's most important responsibility in making the business successful is innovation (Özgül, 2019).
Nazım Salur	Entrepreneur, Founder of Getir and Bitaksi	2021	An entrepreneur is someone who generates a business idea from a situation that everyone complains about (Salur, 2021).

In the table 1, certain words are underlined to emphasize key concepts. Drawing from these emphasized terms and the entirety of the quotations, the essential characteristics of an entrepreneur can be summarized as follows:

➢ Productive and creative
➢ Able to cope with uncertainty
➢ Willing to take risks
➢ Possessing developed leadership and pioneering skills
➢ Adept at seizing opportunities
➢ Passionate and enthusiastic about their work
➢ Feeling a sense of responsibility toward society
➢ Competitive and capable of thriving in competitive environments
➢ Innovative

These characteristics indicate that identifying problems and demonstrating a desire to create solutions are fundamental aspects of entrepreneurship. Ventures are often born out of necessity. When an individual experiences a problem in daily life or witnesses one faced by others, it is likely that the issue affects many people. While the pursuit of economic gain may drive entrepreneurial efforts, the curiosity to explore and the urge to create often lead entrepreneurs to turn crises into opportunities by devising solutions to these problems.

Entrepreneurship Education

Entrepreneurship education refers to training provided by mentors or educators to entrepreneurs or individuals aspiring to be entrepreneurs, equipping them with fundamental entrepreneurial knowledge, changing their perspectives, enabling them to develop and present prototypes, establish networks, conduct target audience and market research, and ultimately bring their projects to life. This process aims to provide both material and intangible benefits to support these individuals.

Such training is often conducted in structures known as technoparks, technocities, or incubators, where universities and industries collaborate. These initiatives nurture entrepreneurs and facilitate the realization of new entrepreneurial ideas. Additionally, some undergraduate and postgraduate programs in universities offer courses on basic entrepreneurship and establish departments focusing on innovation and entrepreneurship.

Historically, entrepreneurship education began in universities in the United States. Initially introduced as course content at undergraduate and postgraduate levels, the system later expanded to other locations, meeting growing demand. Tosunoğlu summarizes this development as follows: *"The first entrepreneurship training in the United States began in 1947 at Harvard Business School. The first academic programs on this subject started in the 1960s and gradually became widespread. By 1993, over 400 U.S. universities offered entrepreneurship courses at undergraduate or postgraduate levels, and this number increased to 1,600 by 2003. Promoting entrepreneurship to create a more entrepreneurial Europe has been among the European Union's primary policies"* (Tosunoğlu, Ürper, & Başar, 2013:139).

These figures have risen in line with technological advancements, increased communication, and growing human needs. While private institutions and organizations have recently joined the entrepreneurship ecosystem, universities remain the primary hubs for such initiatives.

This priority led to the emergence of the concept of Entrepreneurial Universities in the digital age of the 2000s. This concept, first introduced into the literature by Burton Clark, has significantly influenced the traditional structure of universities. The following statements support this assertion:

"The concept of Entrepreneurial Universities, introduced by Burton Clark in 1998, is noteworthy for integrating entrepreneurship with university functions and presenting a new type of university. Significant transformations and reforms have taken place in the higher education systems of many countries today. The fundamental philosophy behind entrepreneurial universities is gradually replacing traditional research universities" (Çetin, 2007:218).

"The primary actors in an ecosystem centered around the university are primarily the university itself, followed by technology development zones, technology transfer offices, or technology and business development centers based on university-industry collaboration" (Fetters, Greene, Rice, & Butler, 2010:178).

For entrepreneurship education to gain a solid footing in contemporary industry, it must go beyond theoretical knowledge to include practical applications. Within this context, the presence of creative industries in the industrial landscape underscores the importance of integrating entrepreneurship and design education. Conducting these two disciplines simultaneously enhances both innovative thinking and the capacity for business success. While design education focuses on developing creative problem-solving and innovative thinking skills, entrepreneurship education enables the transformation of these skills into tangible projects in the business world. Consequently, combining design and entrepreneurship education significantly increases entrepreneurs' chances of success, positioning them more effectively within creative industries.

Creative Industries

Creative industries encompass fields that involve creativity, design, and the production of ideas. These industries are associated with various domains that incorporate creation and innovation, such as art, design, media, entertainment, fashion, cinema, music, and publishing. The intersection of design and entrepreneurship lies within creative industries.

Unlike traditional manufacturing sectors, creative industries prioritize creativity and ideas as the primary factors of production. The critical aspect of this sector is the convergence of creativity with an industrial domain and its realization in practical applications. Therefore, the creativity, innovation, and industry experience of individuals and organizations operating within this sector are of paramount importance.

The United Kingdom's Department for Culture, Media, and Sport (DCMS) offers a widely recognized definition of creative industries in the literature: *"Sectors that rely on individual creativity, skill, and talent and have the potential to create wealth and employment through the development and exploitation of intellectual property"* (DCMS, 2001:4).

In addition to this definition, DCMS has prepared various reports to identify creative industry domains, utilizing Standard Industrial Classification (SIC) codes. These reports state that: *"DCMS developed this proposal by primarily redefining creative professions in light of changing technology and activity perceptions, later determining that any industry with more than 30% creative employment could be considered a candidate for classification as a creative industry"* (Seçilmiş, 2015:11).

Creative industries bridge the concepts of design and entrepreneurship, as both fields focus on transforming ideas into commercial value through creativity and innovation. While design enhances the aesthetic and functional aspects of products or services, entrepreneurship encompasses strategies for presenting these designs to the target audience and establishing a sustainable market. For designers to thrive in this intersection and assume leadership roles, gaining entrepreneurial experience during their education is crucial. These two concepts form a mutually sustaining cycle, reinforcing each other in their shared pursuit of problem-solving and innovation.

The Lack of Entrepreneurship Education for Designers

In the 2011 Icograda Design Education Manifesto, which includes over twenty articles authored by design educators from various countries, a section by Steven Heller and Lita Talarico highlights six key themes: authorship, collaboration, citizenship, design thinking, entrepreneurship, and intellectual property. Despite being written in the past, this manifesto, which envisions the future of design education, argued that entrepreneurship should be an integral part of design education.

Design education traditionally focuses on producing the best outcomes based on established principles. However, when considering the future of design education, it becomes evident that this approach alone will no longer suffice. Design education should not be limited to achieving excellence in production; instead, it must also equip designers with the knowledge and skills to actively participate in post-production processes. In this context, entrepreneurship education becomes essential.

As noted by Heller and Talarico (2011:84): *"Speaking the language of entrepreneurship elevates the designer to a more commanding role, enabling mastery of skills and strategies to create, develop, and produce viable commercial and social products and campaigns."* However, courses on entrepreneurship are predominantly offered in departments such as Economics or Business Administration. Entrepreneurship is often associated with financial content, and students from other disciplines can only access these courses through the university's shared elective course pool. This significantly

reduces the likelihood of design students enrolling in such courses, highlighting the gap in entrepreneurship education for designers.

Despite the growing emphasis on interdisciplinary approaches in education, the lack of entrepreneurship courses specifically tailored to design students limits their ability to transform creative ideas into market-ready solutions. This gap underscores the need for a more integrated educational model that empowers designers with the entrepreneurial competencies required to thrive in competitive creative industries.

Survey on Entrepreneurship Awareness Among Design Students

To better understand the lack of entrepreneurship education in the field of design, Dr. Duygu Sezgin conducted a survey involving 55 students as part of her doctoral dissertation titled *Design Entrepreneurship in Turkiye*. The aim of the survey was to measure students' familiarity with the concept of entrepreneurship and their experiences in entrepreneurial activities. Throughout the research process, students were transparently informed at all stages, and participation was entirely voluntary. To ensure the protection of personal data and confidentiality, all data were anonymized and used solely for academic purposes. The research process was carried out in accordance with ethical guidelines.

Table 2. Summary of survey questions and results

Questions	Response	f	%
Q1. Have you heard of the concept of entrepreneurship before?	Yes	53	96.4
	No	2	3.6
Q2. Have you ever received training on entrepreneurship?	Yes	18	32.7
	No	37	67.3
Q3. Have you ever participated in an entrepreneurial project?	Yes	15	27.3
	No	40	72.7
Q3. Which option best represents you after graduation?	Develop my own project and become an entrepreneur	34	61.8
	Work as a salaried graphic designer in a corporate company	17	30.9
	Work as a graphic designer while pursuing a master's degree and aiming for an academic career	1	1.8
	Work as a graphic designer while also engaging in entrepreneurial activities	1	1.8
	Pursue a master's degree	1	1.8
	Left blank	1	1.8

These results indicate that the majority of students (96.4%) are familiar with the concept of entrepreneurship. However, a significant portion (67.3%) has never received entrepreneurship training, and 72.7% have not participated in any entrepreneurial projects. Despite their awareness of the concept, many students lack experience and, more importantly, formal education in entrepreneurship.

In response to the final question, 61.8% of the students stated that they intend to develop their own projects and become entrepreneurs after graduation. This finding demonstrates that despite the lack of entrepreneurship education, there is strong entrepreneurial potential among students.

The survey findings reveal that although design students are generally familiar with the concept of entrepreneurship, they face significant gaps in terms of entrepreneurship education and project participation. Nevertheless, the majority of students expressed a desire to engage in entrepreneurial activities. This highlights the necessity of enhancing entrepreneurship education and incorporating practical courses into design curricula. The survey results provide quantitative evidence supporting the importance of integrating entrepreneurship education into design programs to foster well-rounded, innovative designers.

Integration of Entrepreneurship Education into Design Education

To integrate design and entrepreneurship processes effectively, it is crucial to first highlight the similarities between them. These similarities can be summarized in four main points. First, both processes focus on solving a problem. In the design process, the problem is solved to meet the needs of the product, whereas in entrepreneurship, the goal is to address market needs or create a business model. Second, both processes involve creating a prototype to test how the solution

works. While design utilizes physical or digital prototypes, entrepreneurship develops prototypes such as business models, product designs, or user experience projects. Third, the prototypes generated in both processes are tested and evaluated. This evaluation determines whether the solution meets the needs and aligns with the market and target audience. Finally, feedback from tests and evaluations in both processes leads to revisions and the development of new solutions. These similarities reveal that design and entrepreneurship are iterative, problem-solving-oriented processes.

Another critical point to consider is whether entrepreneurship is an inherent trait or a learned skill. The debate over whether "entrepreneurship is innate or can be learned through education" has been the subject of much research. While personality traits play a role, entrepreneurship can indeed be learned through education. The key lies in the conditions and content of the education provided. A well-designed entrepreneurship education can uncover latent potential. With a robust entrepreneurship education, individuals can not only contribute to their personal development but also create employment opportunities, benefiting their communities, nations, and even the world. Supporting this perspective, Prof. Dr. Semra Güney states: *"Individuals will acquire previously unrecognized entrepreneurial skills through education and enhance their knowledge to become successful entrepreneurs"* (Güney, 2008:27).

The *Global Entrepreneurship Monitor (GEM)* identifies three main barriers to entrepreneurship: *"social and cultural barriers, lack of capital, and lack of education."* In the United States, policymakers focus on education as a critical first step in fostering long-term entrepreneurship, particularly in regions most affected by manufacturing and industrial job losses (Rideout & Gray, 2013). These insights demonstrate that entrepreneurship can be learned and productive entrepreneurs can be cultivated through proper education.

The relationship between design education and entrepreneurship combines the entrepreneurial skills required to market and sell products or services with the creative expertise inherent in design. While design education focuses on teaching the development of aesthetic and functional aspects of products, entrepreneurship education imparts skills for marketing, sales, and management. This synergy equips designers with the ability to market and manage their creations and allows entrepreneurs to appreciate the value and functionality of design. Consequently, in design technoparks, the products created by designers can achieve higher quality, aesthetics, and functionality.

Design should not merely focus on production but must also secure a place in the market. To achieve this, design education must intersect with entrepreneurship. Both concepts are aimed at solving life's problems, and one of the first educational institutions to combine them with this mission was the Bauhaus School, established in 1919 in Germany by architect Walter Gropius.

In addition to its profound influence on the history of art and design, the Bauhaus School had another significant mission: addressing industrial needs. Opened with the philosophy that "art is for society," the Bauhaus produced solutions tailored to societal needs through art and design. These solutions were not only theoretical but also developed practically in school-affiliated workshops and tested for applicability, resembling today's technopark concept. Prof. Nazan Erkmen's summary of the Bauhaus approach supports this assertion: *"The Bauhaus philosophy aimed to dismantle the wall between applied and fine arts, fostering an environment for their mutual interaction. The Bauhaus educational model was based on a workshop system to develop skills, but the goal was never to train artisans. Workshops were used as research laboratories where industrially required modules were prepared. For the first time, designs were created to meet industrial needs, prototypes were made in textile, glass, and ceramics workshops, and production was developed in factories. Society had the opportunity to use designs realized by artists for the first time. The school aimed to raise artists' awareness of social issues within their communities and instill responsibility while encouraging art to address societal problems"* (Erkmen, 2009:17-18).

The integration of design and entrepreneurship education plays a critical role in advancing creative industries. Designers must possess entrepreneurial skills not only to create aesthetically appealing products but also to ensure their success in the market. This integration enables designers to engage more effectively in the business world and allows entrepreneurs to better understand the value and functionality of design. The convergence of design and entrepreneurship education fosters projects that are both innovative and commercially successful.

Another vital dimension of this integration is the strong connection between entrepreneurship and industry, which facilitates the development of more industry-focused projects. When design and entrepreneurship merge, creative processes extend beyond the art world into technology and industry. The skills gained from entrepreneurship education make designers more equipped and competitive, while entrepreneurs enhance their user-centered thinking abilities before introducing products to the market.

Today's creative industries encompass a wide spectrum, from art to technology, and professionals in these fields greatly benefit from expertise in both design and entrepreneurship. The integration of entrepreneurship education into design education enables the next generation of entrepreneurs to not only conduct business but also innovate and develop creative solutions to societal challenges. This process empowers individuals to bring their projects to life while making a global impact.

In conclusion, the fusion of design and entrepreneurship education enhances individual competencies and contributes to the growth of creative industries and the strengthening of innovation. Developing this educational model will nurture a generation of creative and entrepreneurial individuals capable of meeting industry demands. This collaboration between designers and entrepreneurs has the potential to evolve into a sustainable model for economic and social development.

The Importance of Integrating Entrepreneurship Education into Design Curricula

The integration of entrepreneurship education into design education not only enhances students' creative potential but also equips them with the competencies needed to become successful and effective leaders in the business world. This type of educational model enables designers to produce not only aesthetic and functional products but also acquire the skills necessary to market, manage, and transform these products into sustainable business models.

Although entrepreneurship education is known to have started in primary and secondary schools in the United States and Europe, it is now predominantly observed at the university level. Therefore, analyzing course content through syllabi or instructors' input offers the most reliable approach. In Prof. Dr. Özlem Çetinkaya Bozkurt's book *"Recommendations from Successful Entrepreneurs and Academics,"* a survey conducted with faculty members teaching entrepreneurship courses revealed the following findings, each exceeding 50% agreement: 79% of them believe that the content of entrepreneurship courses should be conducted as a business creation project. 57% of them advocate transforming entrepreneurship courses into seminar-based classes where successful entrepreneurs from the industry give lectures. 73% of them suggest that recommendations from successful industry entrepreneurs should be considered when determining the course content. 86% of them emphasize the need to update course materials in line with industry changes and new applications.80% of them find that teaching techniques such as case studies and scenario analyses are more effective than theoretical lectures. 66% of them propose that team-based work is more effective than individual assignments in entrepreneurship courses (Çetinkaya, 2011).

Based on this information, the following course content is proposed for production-focused faculties, particularly for students in art and design-related departments, to develop their entrepreneurial projects. To integrate entrepreneurship education into design curricula, it is essential to create practical and applied courses specifically tailored to design disciplines. These courses enhance both students creative thinking skills and their ability to succeed in the business world.

An Example of an Innovative Educational Model: 16-Week Course Structure

Below is a proposed course model designed for design departments. The course spans a 16-week curriculum and has been implemented for three years as part of the GRA 412 "Design and Entrepreneurship" senior-year course by Dr. Duygu Sezgin at the Department of Graphic Design, Faculty of Fine Arts, Istanbul Yeni Yüzyıl University.

Table 3. Weekly course content and topic details of the example model prepared for a 16 week design and entrepreneurship course

Week	Topic	Description
1	Course Structure - Examples of Entrepreneurial Projects	The aim of the course, its content, and examples of projects are introduced.
2	What is Entrepreneurship? Who is an Entrepreneur? How to Find a Business Idea?	The concept of entrepreneurship and the characteristics of entrepreneurs are discussed. Methods of finding business ideas are explored. The concept of entrepreneurship is linked to design. Students are asked to identify a problem for the entrepreneurial projects they will work on throughout the semester. They are instructed to develop a solution for this problem that will transform into an entrepreneurial project. They are required to relate their problem selection and solutions to their field of study. They are also asked to use their professional knowledge in branding and corporate identity throughout the visualization processes of the project.
3	What is a Business Model Canvas?	The structure of the business model canvas and how it is used in a business plan are explained. Students are informed that they must complete this canvas for their projects before the midterm. The development of the canvas is tracked in each class.
4	How to Perform a SWOT Analysis? What is a Value Proposition?	The strengths and weaknesses of the project are determined through SWOT analysis. The concept of value proposition is explained with examples.
5	How to Perform a SWOT Analysis? What is a Value Proposition?	The topics from the previous week are further elaborated, and practical exercises are done based on the SWOT table.
6	Who is the Customer and Target Audience?	The process of identifying the target audience and creating customer profiles is discussed.
7	What is a Moodboard? How is It Prepared?	Techniques for creating moodboards are explained, and visual concept development exercises are conducted. Students are asked to use their design-related knowledge.
8	**Midterm Exam**	The students' knowledge and application skills are assessed based on the topics covered in the first seven weeks. They are required to submit the Business Model Canvas, SWOT Analysis, and Moodboard as documents.
9	What is Social Entrepreneurship?	The definition of social entrepreneurship, examples, and its contributions to society are discussed.
10	What is Revenue and Pricing?	Revenue models and pricing strategies are discussed based on the entrepreneurial projects where students have created business models, conducted SWOT analyses, and developed moodboards.
11	How to Prepare for the Investment Process?	The processes of communicating with investors, preparing a business plan, and presentation techniques are examined.
12	How Does the Company Formation and Branding Process Work?	The steps of company formation, branding, and brand management are elaborated.
13	How to Present? What Are Presentation Techniques?	Effective presentation techniques are taught. Details are provided regarding how their projects should be presented.
14	Final Preparation	Preparation for the final exam, including the creation of project presentation files and oral presentation practices. Final presentation details are shared with students through sample presentation files.
15	Final Preparation	Final project details are completed, and a presentation rehearsal is conducted.
16	**Final Exam**	Students submit both written project files and deliver oral presentations. A jury-investor presentation environment is created in class, and time management is ensured using a timer**.**

These findings demonstrate the necessity of enabling individuals who undergo this training to gain mastery over all stages of their projects, from the ideation phase to the end-user experience. To achieve this, it is crucial for trainees to engage not only in classroom activities but also in active fieldwork within the industry. This includes recognizing

competitors, analyzing existing operational systems, comparing similar projects with their own, and gathering user experience data and customer feedback.

Simultaneously, integrating entrepreneurship training with the relevant art and design department is vital. In this example, which focuses on the Department of Graphic Design, students were tasked with creating brand identities, designing corporate identities, and utilizing design principles while preparing moodboards. Similar discipline-specific attributes can be incorporated into entrepreneurship education in other art and design departments.

This program serves as an exemplary model, illustrating how entrepreneurship education can be tailored and integrated into different creative disciplines.

Conclusion

This study demonstrates that the integration of design and entrepreneurship disciplines can significantly contribute to both educational processes and creative industries. Design education fosters creative problem-solving and innovative thinking skills, while entrepreneurship education enables the transformation of these skills into tangible projects. Particularly, the applied education model has proven effective in enhancing students' creative and entrepreneurial competencies.

The educational model employed in this study enabled students to approach design projects with an entrepreneurial mindset, equipping them with skills in business model creation, customer analysis, and product marketing. Survey results and jury evaluations revealed that students improved their awareness and knowledge throughout this process, and that applied courses provided an effective learning environment. The sustainability of the example course model over three years validates this assertion.

Integrating design and entrepreneurship education not only enhances individual skills but also lays the foundation for producing more effective and innovative solutions in the creative industries. In this context, it has been concluded that the proposed model, either in its current form or adapted for specific disciplines, could be implemented across various art and design fields, fostering interdisciplinary collaboration.

The outcomes of this study have facilitated the development of an innovative model both theoretically and practically, offering content that can guide future educational initiatives.

Recommendations

To enhance the integration of entrepreneurship education in design curricula, the following recommendations are proposed:

Applied and Interdisciplinary Courses: Incorporate practical, project-based courses tailored to design students to strengthen their entrepreneurial skills.

Industry Collaboration: Establish partnerships with industry professionals to provide students with real-world insights and mentorship opportunities.

Continuous Curriculum Updates: Regularly revise course content to align with evolving market needs and technological advancements.

Encourage Team-Based Work: Promote collaborative projects to foster teamwork, creativity, and problem-solving abilities.

These recommendations aim to bridge the gap between design education and entrepreneurial practice, preparing students for both creative and business success.

Acknowledgement

Biodata of Author

Dr. **Duygu Sezgin**, born in 1988 in Çanakkale, completed her undergraduate and graduate studies with a full scholarship at FMV Işık University and earned her Proficiency in Art (PhD) degree from Mimar Sinan Fine Arts University. Since 2017, she has been serving as a faculty member in the Department of Graphic Design at T.C. İstanbul Yeni Yüzyıl University, Faculty of Fine Arts. Sezgin teaches theoretical and practical courses at the undergraduate level, including graphic design, entrepreneurship, typography, semiotics, and advertising graphics. Engaged in various original projects in the fields of art and design, Sezgin has participated in national and international exhibitions and undertaken curatorial roles. Her academic and artistic endeavors focus on exploring and applying interdisciplinary subjects related to design disciplines. She continues to conduct research and projects at the intersection of design and entrepreneurship.

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Figure 1. The Double Diamond model, developed by the British Design Council. https://www.designcouncil.org.uk/our-resources/framework-for-innovation/

Research Article

Compilation of volumes by Little Qamil (Qamili i Vogël): an important document tracing the traditional Albanian musical culture[1]

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Article Info	Abstract
	In addition to his invaluable role as a singer-songwriter and performer of traditional Albanian songs, this paper will focus on the contribution of Little Qamil [Qamili i Vogël] as to the arrangement and compilation of his 11 volumes containing various traditional songs from all the regions inhabited by Albanians. In the presentation of this paper, we will delve into the ethnomusical aspect of the extensive collection of nearly 400 songs from various Albanian regions featured in the pages of the volumes concerned. What are the songs from the Albanian areas outlined in these 11 volumes? What is the harmonic and rhythmic structure of these songs? Why is it crucial to preserve, document, and systematize all this creative work of Little Qamil [Qamili i Vogël] contained in these volumes for the benefit of future generations? Questions as such will help us uncover the connections and intersections that Little Qamil [Qamili i Vogël] has had with the Albanian musical tradition. The paper will also underscore the significant role played by the entire repertoire collected by him, serving as a primary and crucial reference to the concept of originality, as well as for its gradual musicalization and accompaniment with musical instruments, eventually becoming a significant part of the Albanian civic song.

To cite this article

Introduction

When examining and analyzing this content from an ethnomusicological perspective, all this material including its authored songs and materials gathered from various Albanian regions, it addresses a significant issue regarding necessary generalizations concerning the history of traditional Albanian music. As ultimately, to establish a structured historical account for the future generations so they could comprehend past and present musical endeavors more clearly, this form of documentation and systematization is an imperative.

Ethnomusicologist Bahtir Sheholli, in his work *"Melopoetic features of traditional singing"*, published by the Institute of Albanology to commemorate the 10th anniversary of his passing. In his essay on Little Qamil *[Qamili i Vogël]* entitled *"The tradition of our musical folklore as a spiritual link with the creativity of Little Qamil* [Qamili i Vogël]*"*, Sheholli, *inter alia*, recalls, I quote: *"I still have fresh memories regarding the conversations we had at the Institute of Albanology of Prishtina just few months prior to his [Little Qamil's] death, where he expressed his regret for not being able to bring his songs to life as he had hoped for so long, not only by recording them on audio and video cassettes, but also by melographing them"* (Sheholli, 2020:247). Therefore, the melographing of Little Qamil's [*Qamili i Vogël*] 10

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[1] Within the folklore session of the Albanology Week held on June 9th, 2022, I made a presentation regarding Little Qamil's [Qamili i Vogël] significant contribution to volumes where love-themed lyrics are examined. This paper is more complete and relates to all the materials contained across the 11 volumes concerned.

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volumes, because the first volume entitled "*Bylbyli në Çabrat [*The Nightingale in Çabrat]" issued in 1957 and reissued in 1961, was melographed by Professor Lorenc Antoni. The availability of gramophone discs, audio, and video recordings has made it easier and possible to melograph these songs, providing valuable material for a comprehensive monograph on Little Qamil *[Qamili i Vogël]* as an excellent songwriter and performer of our traditional songs.
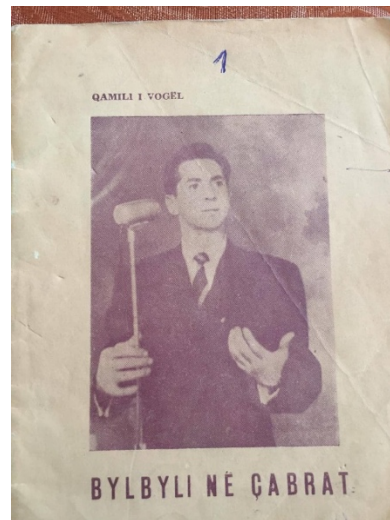

Photo 1. The Volume "*Bylbyli në Çabrat [Nightingale in Çabrat]*", from 1957[3]

At first glance, it is easy to understand that love is the predominant motif in most of the songs of Little Qamil *[Qamili i Vogël]* published in his 11 volumes, and represents a great approach and variety in the treatment of love as a feeling. These were the songs which he performed with a masterful ease throughout his life and activity. The lyrical songs in this collection exhibit a clear and discrete incorporation of complex and intricate themes in their melodic aspect of their form. If we refer to the analysis of the form of these musical materials we notice that the basic motif has evolved into fuller and more elaborate themes, especially in his later creations. The love-themed songs in the creativity of Qamili e Vogël are regarded as some of the richest, most cultivated and most embraced forms of our folk lyrics. This is because they directly express human soul and depict the sensory world, transcendent of place, time, and space where the unit concerned was created and practiced. As love songs everywhere express the most intimate feelings of an adult person, reflecting a fundamental inherent physiological need closely tied to the love of life, thus being permeated with a rich artistic figurative representation, yet remain grounded in realism, devoid of excessive elements, generally with acceptable undertones for every kind of cultural setting (Xhagolli, 2007:273).
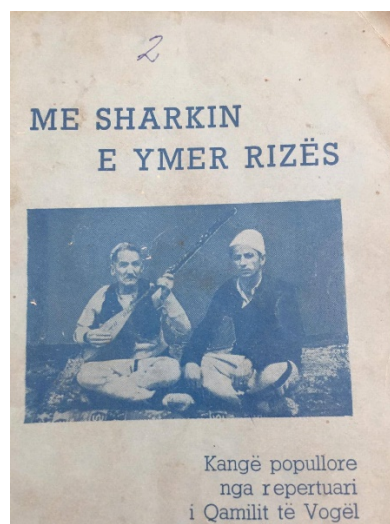

Photo 2. "Me sharkinë e Ymer Rizës" [With Ymer Riza's shargia], issued in 1959 (reissued in 1961), 50 songs in total.

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[3] This volume contains 19 music materials authored by Little Qamil [Qamili i Vogël]. It is the only volume melographed by the ethnomusicologist, Lorenc Antoni.

In our popular psychology, being attracted by the beauty has been consistently associated with positivity, encompassing both outward and inward beauty. As a result, the artistic essence of these songs was brought to life by highlighting the most exquisite elements from the common artist's humble surroundings. Furthermore, these musical compositions exhibit a blend of monologues and dialogues, conveying poetic-musical sentiments that resonate with themes of life, love, and the accompanying struggles: undeniably, the renowned events and figures from our history, play a significant role in all of the artist's creative and interpretative endeavors.

The most notable collection of songs by Little Qamil *[Qamili i Vogël]*, like many in our traditional folklore, consist of lyrical songs with elegiac undertones, depicting various aspects of spiritual state of people. In light of this observation, ethnomusicologist Bahtir Sheholli would comment that: "*most of the songs created by Little Qamil* [Qamili i Vogël]*, depict a particular atmosphere both synchronically and diachronically, suggesting a chronological sequence for them. Hence, the classification of the songs by Little Qamil* [Qamili e Vogël] *merely offers a descriptive and structural representation of the poetic and musical extensiveness, claims that need to be implemented through systematization by ethnomusicologists*" (Sheholli, 2020:247).
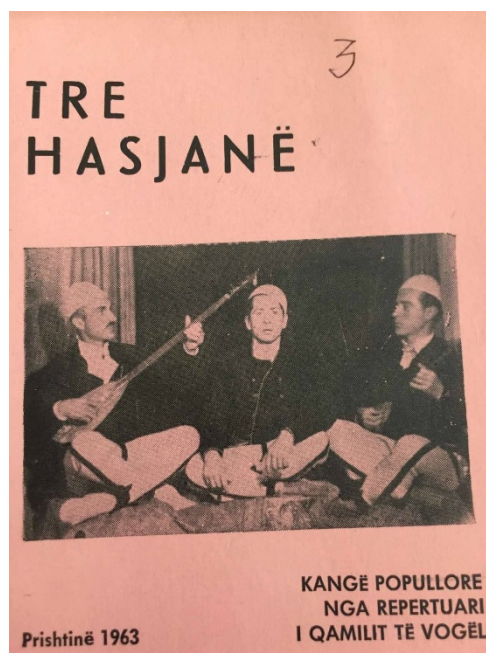
Photo 3. "Tre Hasjanë" [Three Hasjans] (1963), 35 songs in total.

The songs originating from Northern Albania region showcase musical elements that have played a significant role in shaping the being of our national identity. Crucial factors indicate that, apart from diatonic components, chromatic components also appear as a feature of their tonal and modal system. Factors like alteration, grafting, and modulation of certain scale degrees for a semitone up or down; b) a double use of the melodic-harmonic structure both as in a natural and/or altered state of certain degrees of the musical scale, etc. As far as the tonal system is concerned, the traditional music of Northern Albania shares similarities with traditional civic music (*single-voice* civic musical grouping): in both cases, there is a double modal/tonal system: either diatonic and/or chromatic at times.

Photo 4. "Lulet e Beharit" [Flowers of Springtime] (1960), 50 songs in total

In the volumes of Little Qamil *[Qamili i Vogël]*, we would also come across traditional songs from Central Albania. The traditional civic song(s) of Central Albania represents the musical style of traditional Albanian civic music in various aspects such as melody, rhythm, modal and tonal system, and structure, etc. Concerning the style of the songs originationg from this region, i.e., the traditional songs of the Central Albania, ethnomusicologist Spiro Shetuni would argue that: *if you want to study the style of songs from this region, it means gaining a somewhat clear understanding of the fundamental material-substantial features and structural-formal elements of the traditional Albanian civic music as a whole* (Shetuni, 2011, 142).
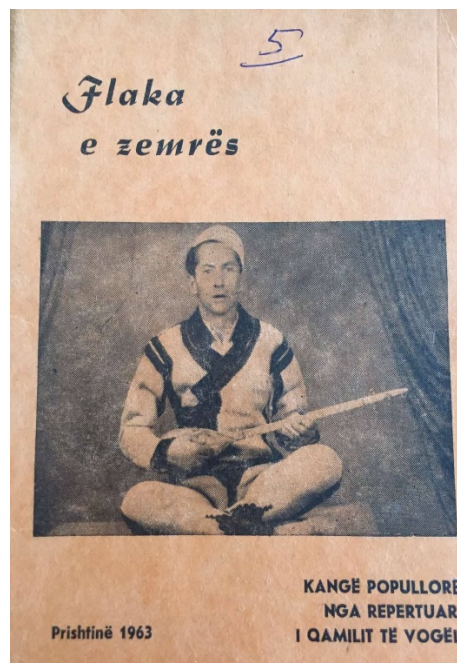
Photo 5. "Flaka e zemrës" [Flames of the heart] (1963), 30 songs in total

The ashik *[love-themed]* songs are also present in the volumes of Little Qamil *[Qamili i Vogël]*. These songs, inspired by the ideas of Aljamiado literature[4], are characterized by a melostrophic structure, with alternating rhyme and verses, which is rather uncommon in Albanian traditional folk poetry. The musical compositions include refrains with developed forms, typically performed within oriental musical scales, under various maqāms, be it in simple and

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[4] The literature concerned was composed in bayt (two-line verses) format and in international academic circles is recognized as aljamiado literature (derived from the Arabic term *al-'ajamiyya*, meaning: foreign, non-Arabic). This form of poetic expression was prominent during the 18th century, preceding the emergence of the national literature of the Albanian National Renaissance.

compound and transposed maqāms *[rhythmic cycles]*, accompanied by musical instruments of oriental origin such as shargia, bugarija, daire, etc.

Photo 6. "Këndojnë bylbylat" [The singing of nightingales] (1973), 35 songs in total

Upon careful examination of the songs featured on the pages of these volumes, we have to emphasize that they primarily focus on the recognition and celebration of our traditional songs not only in a realm of patriotic, warlike expression, but also in a sensible and a cultured context of its sensivity. It is important to highlight this aspect as we have either passionately or dispassionately tried to identify ourselves with the wars we have fought, the blood that has been shed, and have, in some way, neglected certain elements that make up human life at an educational and scientific level, elements pertaining to conscience, the soul of individuals and their sentimental world. Furthermore, it is noteworthy that the content that is contained in these volumes is not limited to specific moments, given once and for all in close chapters of musical life. They span throughout our entire history, bearing witness of the invaluable heritage we have inherited in this regard.
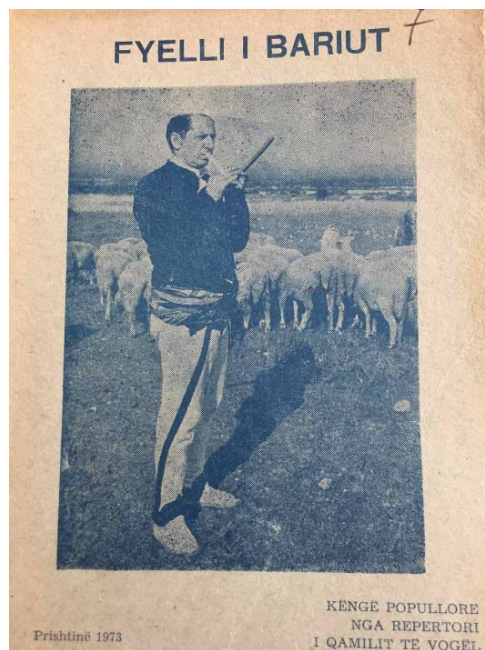

Photo 7. "Fyelli i bariut" [The shepherd's flute] (1973), 35 songs in total

If we look into the creative and interpretative work of Little Qamil *[Qamil i Vogël]*, it is important to highlight the fact that his artistic singing was always clear, visible, and enduring. Professor Hamide Stringa, a researcher in Musicology

and Belcanto, in one of our meetings during my studies, about the vocal qualities of Little Qamil *[Qamili i Vogël]* would say the following: *the genuineness and originality of his brilliant vocal made his singing have a powerful impact, as well as an enjoyable musical experience. She stated that he also showcased a high level of flexibility in his voice, allowing him to capture the nuances of elaborate ornamental melodies and achieve his artistic objectives with an extremely refined taste (Stringa, 2007: Tirana).* His voice exuded a powerful, clear, and pure intonation, both while interpreting old musical pieces or creating new original songs. Almost all original songs of Little Qamil *[Qamili i Vogël]* are performed with the traditional folk orchestra of the civic tradition, often combined with traditional musical instruments such as chiftelia, shargia, shepherd's flute, and daire, etc., according to which principle he preserved authentic national soundings and intonations.

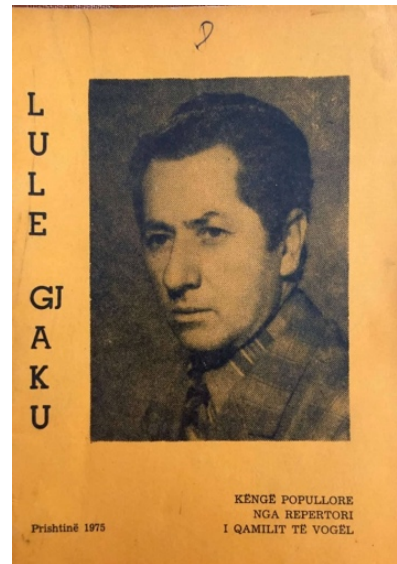**Photo 8.** "Lule gjaku" [Flowers of Blood], (1975), 34 songs in total
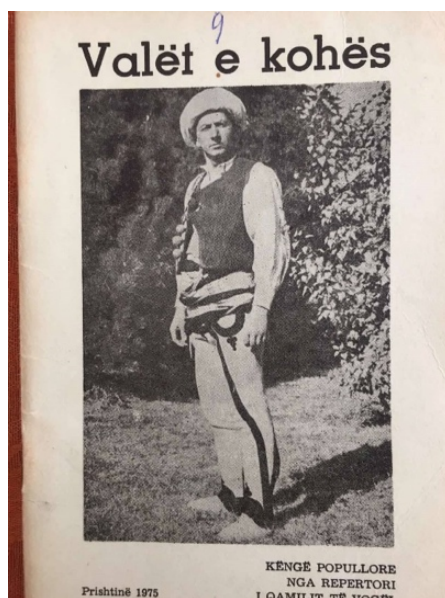
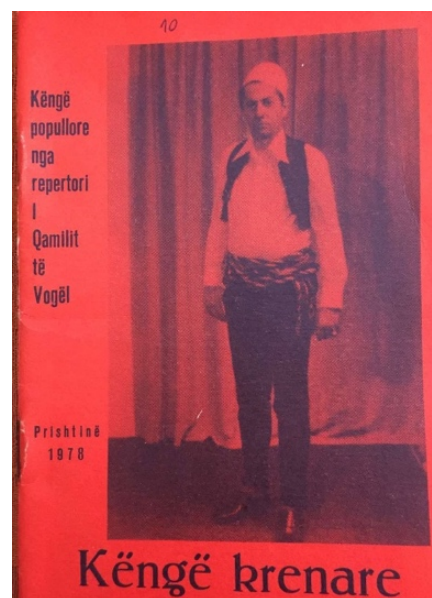**Photo 9.** "Valët e kohës" [Waves of time][5]   **Photo 10.** "Këngë krenare" [Proud songs][6]

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[5] The volume 9 titled: " *Waves of time* " (1975) by Little Qamil *[Qamili i Vogël]* contains 33 traditional songs in total.
[6] The volume 10 titled: "*Proud Songs*" (1978) contains 32 traditional songs in total.
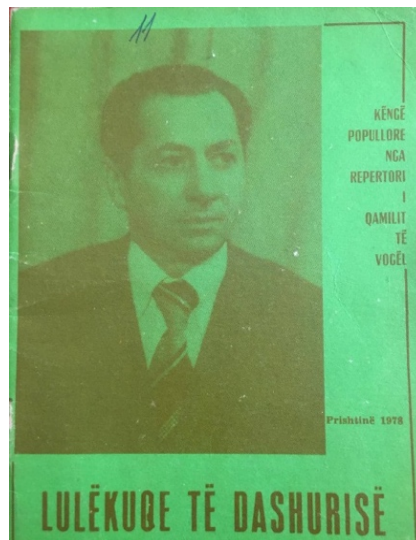
Photo 11. "Lulëkuqe të dashurisë" [Poppies of love][7]

Conclusion

In conclusion, it can be stated that all the materials provided in these 11 volumes, with nearly 400 traditional Albanian songs, serve as a significant contribution to our Albanian folklore as a whole. This compilation will continue to serve as a crucial resource for documenting the various aspects of traditional Albanian musical culture, sung with passion, longing, and dedication, as well as for purposes of analyzing the origins, forms, structures, and characteristics of traditional Albanian songs in general. In this context, all the subjects covered in these volumes are of interest and contribute to forming generalizations about authentic national cultures (which is highly crucial). As these generalizations serve as a foundation for drawing further conclusions, because these values are well-documented. However, if they are not properly documented, or achived, over time they would risk losing their significance. Conversely, when values are documented and approached with due care and dedication, they retain their value even in contemporary times.

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Muzika në reflekset e kohës, a selection of works, "Erpoprint," Gjakova, 2007.

Gjakova brenda muzikës, monograph, "Erpoprint," Gjakova, 2010.

Dasma në qytetin e Gjakovës, monograph, Albanology Institute, Pristina, 2015.

Tradita e muzikës sufiste në Kosovë, monograph, Albanology Institute, Pristina, 2022.

Critical Observations from Ethnomusicology, a selection of works in English, Eliva Press, Moldova, 2023.

Gjurmë të Qamilit të Vogël në muzikë, monograph, Artini, Pristina, 2024.Affiliation: Institute of Albanology of Prishtina, Prishtina, Kosovo

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[7] The last volume, "*Poppies of love*" (1978), contains 35 traditional songs originating from the Albanian-speaking regions.

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Research Article

Machine learning in audio mastering: a comparative study

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Article Info	Abstract
	Machine learning approaches now utilized in audio mastering are transforming traditional workflows. This comparative study examines the effectiveness of supervised and unsupervised methods in the mastering process. Platforms such as LANDR employ supervised models that emulate expert engineers, offering cost-effective options for independent artists, while unsupervised techniques aid spectral balance and dynamic range optimization. The methodology relies on objective metrics—including Distortion Meter, Dynamic Range, Loudness Penalty, Intelligibility, and High Frequency Distortion—along with subjective listening assessments. Statistical analyses show that human engineers surpass AI systems in preserving dynamic range, minimizing distortion, and maintaining sonic clarity, particularly for complex genres like classical and jazz. Empirical research reveals AI mastering causes greater distortion, narrower dynamic range, and higher loudness penalties. In contrast, engineers deliver superior audio quality through broader dynamic range, lower distortion, and enhanced intelligibility. While AI quickly provides reasonable results for simpler styles like Pop and Electronic, human expertise offers advantages for complex compositions where aesthetic judgment is key. These findings indicate that despite technological progress, human know-how remains critically vital in creative decision-making. The study also points to potential for human-machine collaboration in mastering, with AI initially optimizing parameters and engineers making refined aesthetic adjustments to enhance quality. This hybrid approach could unite technological efficiency with artistic excellence. Future work should focus on improving AI's ability to emulate human aesthetic decisions, developing genre-specific mastering, and incorporating techniques like generative adversarial networks to mastering. These advancements may pave the way for hybrid systems fusing human creativity and machine efficiency.

To cite this article

Introduction

Mastering audio -the last stage of music production in modern times- represents one of the most importance process of establishing the sonic aesthetic and structural signature of a recording, often deciding the fate of its life. This area has historically worked at the intersection of mechanical accuracy and visual intuition, travelled by proficiency engineers over years of perceptual training} based on partial experience. Birtchnell (2018) provides an especially subtle description of this phenomenon, for instance: "[Mastering engineers have] developed critical listening skills over decades to maintain the emotional and tonal integrity of a piece of music that could not be considered in a purely mathematical way from the measured values of various technical parameters" That way of thinking about experience as a foundation for knowledge has traditionally been the most common epistemology in professional audio production contexts.

But technological innovation has profoundly shifted the ontology of the contemporary. Artificial intelligence tools have a re-organising impact on the processes of mastering as they have altered the accessibility problem of mastering

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while also troubling old ideas about aesthetic standards. According to Sterne and Razlogova (2019), "the 'mastering' process is being democratized through supervised learning patterns found algorithms, such as LANDR that similarly to engineers, train on thousands of mastering examples taken from professional environments in order to determine the treatment effects." Such a change is not a mere adaptation to technical modes however but shifts a cultural economy of new audio production within the horrible temporalities komplett of production as a whole.

For independent artists and small-scale production entities, algorithmic mastering systems provide unprecedented access to sophisticated processing capabilities that were once reserved for niche studios. Purwins et al. As (2019) break down the technical complexity of current architectures: "Deep learning models automatically analyze and optimize spectral balance, dynamic range, and sound height in a complex mastering process that would traditionally rely on a sound engineer's extensive experience" But such technological democratization also raises deep issues about what is to be considered expertise, and what its state is in many contexts of production today. Yet, having established an algorithmic approach to a domain that fundamentally relies on contextual interpretation and affective understanding, the practice has considerable limitations. The restriction is expressed particularly clearly by Smit and Lee (2022): "Although robots can be programmed to automate some technical aspects of artistry, artificial intelligence systems cannot replicate a human engineers' understanding of a musical context, interpret an artists vision, or assess its aesthetic nuance. The inequity between the automatism of technology and the contextual understanding required to apply it highlights the need for a robust theoretical lens to frame the complementary connection between technological systems and human insight.

Some 40 years have passed since significant changes in audio technologies, communication networks, and production methods reshaped professional practice and human interaction. At the same time, these developments have both increased the demand for specialized expertise and driven the creation of new professional categories with unique technical and aesthetic needs. At the same time, music production processes (transcription, time alignment, signal separation, mixing, etc.) have seen growing scholarly interest in algorithmic use. Underneath the height of the eco-systemic pyramid which is the mastering stage (containing mixed audio being subjected to its final processing, either terminal or perceptual homogenization, followed by arbitrary calibration to its eventual habitat), it houses a range of sonic beautification. This importance of such interventions for overall sonic quality has been well documented in the academic literature. Modern methods still largely consist of manual processes—dependent on the engineer's perceptual sensitivity and technical expertise—but emerging methods are beginning to include advanced signal-processing methods, neural networks, and machine learning hacks.

The automatic mastering paradigm is, however, a step closer to algorithmic independence: it strives to emulate the decision-making processes of mastering engineers, targeting professional-grade results solely through computational means. Though many academic research efforts suggested different computerized approaches till date gold standard is not reached in this field. Still, practitioners are adopting these technologies more and more to increase capacity, improve impact, and deliver results more efficiently and cost-effectively.

This study provides comparative insight into contrasting modes of collective intelligence in music production: collaborative networks of enabling that support producers with intelligent agents that can offer compositional or technical advice, and freestanding mastering bots operating as independent systems. This study examines the influence of supervised and unsupervised machine learning applications appeared in the literature as mastering processes when analyzing sonic quality, dynamic range and intelligibility using both objective measures and subjective perceptual tests. This detailed discussion should serve as a basis to clarify the pros and cons of using AI-assisted versus human-engineered mastering strategies, offering both theoretical resources to help pinpoint when human ingenuity or computational resources should be employed in modern sound engineering. In this paper, we aim to deepen our insight into how innovation in technology both disrupts and reaffirms core creative practice in audio production.

Machine Learning in Audio Mastering

Within the diverse terrain of digital signal processing, machine learning has emerged as a transformative paradigm, fundamentally reconfiguring established practices—nowhere more evidently than in the domain of audio mastering.

Historically, this process has constituted a sophisticated synthesis of technical precision and creative intuition, wherein experienced engineers meticulously balance frequencies, adjust dynamics, and enhance sonic qualities through deliberate intervention. However, the accelerating development of machine learning technologies has precipitated a profound epistemological shift, introducing possibilities for process automation that simultaneously reshapes industry structures and challenges conventional understandings of mastering expertise (Purwins et al., 2019; Birtchnell, 2018).

Platforms employing supervised machine learning methodologies—LANDR representing perhaps the most notable exemplar—have established themselves as significant agents in this transformation. Through sophisticated analysis of extensive corpora of previously mastered recordings, these systems effectively simulate the decision-making processes of professional engineers, offering temporally efficient and economically accessible automated solutions (Sterne & Razlogova, 2019, 2021). The emergence of these technological frameworks has generated considerable interest, particularly among independent musicians and producers lacking access to conventional mastering resources. By democratizing previously restricted technical processes, these platforms fundamentally reconfigure the production landscape.

Deep learning architectures demonstrate particular promise in simplifying—and potentially automating—the more complex procedural elements intrinsic to mastering practice, including dynamic range compression, equalization, stereo enhancement, and loudness normalization (Smit & Lee, 2022). These models exhibit remarkable capacity for pattern recognition within audio data, effectively performing technical operations previously requiring substantial human expertise. Moreover, machine learning applications extend beyond mastering contexts, encompassing speech recognition, music information retrieval, and bioacoustic classification—illustrating the remarkable versatility of these technologies within broader audio processing domains (Purwins et al., 2019; Nagesh & Kumari, 2021).

Despite these technological advancements, human expertise retains inestimable value, particularly within mastering contexts requiring critical listening and intuitive judgment. While machine learning effectively automates technical processes, it encounters significant limitations in replicating the creative and aesthetic decisions characteristic of experienced sound engineers (Birtchnell, 2018). Consequently, as machine learning becomes increasingly integrated within audio processing frameworks, profound questions emerge regarding the appropriate equilibrium between automation and human creativity.

As Sterne and Razlogova (2019) astutely observe, machine learning will inevitably shape not merely the technical dimensions of audio production but fundamentally transform how music is experienced and perceived, potentially reconfiguring aesthetic and cultural practices within broader music industry contexts (Roch, 2021). This technological evolution thus represents not merely a technical reconfiguration but a comprehensive transformation of creative practice—one demanding careful consideration of how technological systems might complement rather than supplant human aesthetic judgment.

Automatic Mastering Systems

The landscape of Automatic Audio Mastering (AAM) systems has witnessed remarkable transformations in recent years, manifesting across both commercial and open-source domains with distinct developmental trajectories. Commercial AAM solutions primarily operate through online platforms, offering services at moderate to premium price points, while their free counterparts exist as standalone applications or web-based interfaces. These systems have undergone rigorous evaluation through diverse user experience studies, with their hierarchical classification largely determined by impression ratings gathered from communities predominantly comprising independent artists—a demographic that has emerged as the primary beneficiary of these technological innovations.

The evolution of unsupervised machine learning (UML) has served as a critical catalyst in the developmental arc of AAM systems. UML methodologies present novel automation paradigms for complex tasks such as mastering through their capacity to identify patterns within unlabeled data without human intervention (Samreen Naeem et al., 2023). Algorithmic approaches including k-means clustering, principal component analysis, and multidimensional scaling have substantially enhanced the sophistication with which AAM systems analyze and process audio data, representing a significant advancement in computational approaches to sound engineering (Xiangdong Wu et al., 2021).

Computer-Aided Mastering (CAM) systems represent a particularly intriguing development through their integration of collaborative methodologies derived from music and design disciplines. Platforms such as MUMS offer users guidance in parameter adjustment—including volume curves, amplitude characteristics, and harmonic profiles—providing optimization recommendations intended to elevate recording quality. These systems employ recommendation algorithms specifically calibrated for mastering tasks, constituting an innovative approach within the broader domain of automated music mastering (Pasquier et al., 2016).

Nevertheless, significant epistemological limitations persist regarding how CAM systems navigate complex mastering decisions. Particular challenges emerge in the optimization of compressor settings and harmonic exciters—parameters requiring nuanced adjustment responsive to musical context. The capacity of these systems to represent musical context and transformations solely through control parameters remains an area ripe for further development, revealing the boundaries of current algorithmic approaches to mastering processes.

Despite these constraints, CAM systems have achieved notable advancements in adjacent domains such as internet-based collaborative music creation. Projects including Public Sound Object and FMOL have expanded the frontiers of collective music production and automatic mastering tools by facilitating real-time collaboration among users (Jordà & Barbosa, 2001). These developments suggest potential pathways toward more integrated creative environments that leverage both human and computational capabilities.

The developmental trajectory of automatic mastering systems underscores the potential for human-machine collaboration in the future landscape of audio engineering. While these systems continue to demonstrate limitations in specific audio processing tasks, they nevertheless signal a paradigmatic shift toward more intuitive and collaborative mastering environments. The ongoing evolution of CAM research, particularly in conjunction with open-source and collaborative platforms, illustrates how algorithmic processes might contribute to artists' and producers' capacity to achieve higher quality outcomes, reduce requirements for manual intervention, and facilitate creative processes within digital environments—suggesting a symbiotic relationship between human creativity and computational efficiency in contemporary audio production.

Methodological Approaches and Analytical Framework

The methodological framework that we employ incorporates a multi-faceted inspection of different computational systems—especially, deep learning architectures—and how they deal with these aspects of mastering algorithms with respect to dynamic range, equalization, and loudness over time normalization. Via the same rigor that permeates scientific experimental protocol as well as analytical frameworks, we attempt to pinpoint not merely technically adept methods, but methods that improve sounds. While a framework of this kind may easily begin to resemble a lock-specification model for mastering—i.e., something overshifted toward worded technical optimization as a design-objective space, the reader understands that the lock-specification scores will, most usefully be applied to comment on transformations of subjectively experienced sonic engagement—that is transforming the way one feels about what is being done to their sounds, and ultimately the experience of sonic engagement with the master processes.

While appreciating the amazing potential of machine learning systems to automate technical processes, our research addresses at the same time a number of fundamental questions related to the optimal ratio between computational efficiency and human creativity. Sound engineers bring irreplaceable perceptual sensibility and aesthetics to the mastering process which computational systems are not able to provide solely through algorithmic processing. Hence, this study primarily suggests moving beyond not only technical possibilities but also certain limitations and challenges of some algorithmic approaches to mastering, focusing on areas where human contribution is not only valuable but vital.

Theoretical Implications and General Importance

The importance of this research goes beyond the narrow framework of this discipline, providing theoretical insights that can be applied to many neighboring fields, such as musicology to digital humanities, cultural studies, and media theory. The examination of how technological systems affect the arrangements of creating, making, and crafting contributes to broader theoretical debates and further discussions regarding the specifics of any artistic activity in the conditions of computational adjustments. The overall theoretical situation in the history of the relationship between creativity and

artificial intelligence, where the AI force is increasingly pushing its way into the creative industries, dictates a thorough reflection on what technical and aesthetic innovations these systems make possible and which established ideas of creativity and taste they tend to undermine. Therefore, the main goal of this research is to shed some light on the mysteries of automatic mastering not as things in themselves but as cultural activities aimed at transforming how sonic artifacts are made, heard, and appreciated. That is why, by analyzing and criticall accessing some results of technological activity we strive to make contributions to music industries that may affect the future development of music production. I hope that our readers will take this intellectual journey with us to explore the connections between human perception and machine learning, between human creativity and computer analytics, and the constantly shifting boundaries between them.

Background and Theoretical Foundations

Automatic or intelligent mastering represents one of the most innovative domains in contemporary audio engineering—a field characterized by the development of sophisticated tools designed to augment the capabilities of sound engineers through computational means. Within the broader context of musical production processes—particularly during the critical mastering phase -we observe a proliferation of proposals for intelligent electronic systems capable of executing quality assessment tasks with increasing sophistication. These systems represent significant technological complexity, necessitating resolution of diverse and numerous challenges while simultaneously accounting for the musical context within which they operate. This research aims to illuminate the maturity of automatic intelligent mastering systems through empirical evidence supporting results achieved through multiple implementation alternatives, thereby contributing to our understanding of how computational approaches transform established audio engineering practices. Our primary objective centers on enabling experts and interested researchers to independently explore, test, and compare automatic mastering outcomes- a methodological orientation that emphasizes empirical verification rather than theoretical speculation. The transparency of musical datasets and open-source software utilized in this investigation constitutes a critical contribution to the continued development of automatic intelligent mastering systems, providing essential resources for future scholarly and practical applications within this rapidly evolving domain.

Automatic intelligent mastering represents a technological field oriented toward developing computational tools that assist sound engineers and professional composers in enhancing the sonic qualities of musical works. Beyond mere enhancement, these systems facilitate technical optimization, enabling engineers to achieve superior audio quality through systematic intervention. These interventions are executed specifically in response to the characteristic properties of musical signals—a contextual responsiveness that distinguishes intelligent systems from more mechanical processing approaches. Digital music signals undergo meticulous analysis and controlled manipulation by intelligent electronic programs, typically integrated within Digital Audio Workstations (DAWs) as auxiliary utilities that extend traditional production capabilities.

The processes of automatic or intelligent mastering constitute sophisticated musical operations applied to final mixes, with the essential requirement of ensuring necessary coherence across varied listening contexts. When developing intelligent mastering algorithms, researchers must acknowledge inherent limitations within computational approaches, recognizing that target musical parameters transcend purely technical considerations—often encompassing musicality and creativity, domains traditionally resistant to algorithmic formalization. This recognition of boundaries between technical optimization and artistic judgment represents a central theoretical challenge within automated mastering research, highlighting the complex interrelationship between computational precision and aesthetic discernment in contemporary audio production contexts.

Evaluative Framework and Metric Conceptualization

This investigation employs five distinct metrics to evaluate the mastering process, providing a multidimensional analytical framework for comparative assessment:

Distortion Meter (DM), Dynamic Range (DR), Loudness Penalty (LP), Intelligibility (IT), and High Frequency Distortion (HFD). We begin by establishing mathematical definitions for these metrics, with particular emphasis on our

novel introduction of the Intelligibility metric—representing an original contribution to evaluative methodologies in this domain.

Distortion Meter (DM): This metric quantifies the percentage of temporal segments wherein input and output samples exhibit statistically significant variation. DM values range from 100% (indicating complete absence of correlation between input and output signals) to 0% (signifying substantial similarity between signals)-providing a gradient measurement of signal transformation through the mastering process.

Dynamic Range (DR): This metric assesses the range of sample values in the output signal, spanning from silence to clipping thresholds. Given that LP metrics rely on modular values of transmitted parameters, pink noise serves as a standardizing reference point for measurement implementation.

Loudness Penalty (LP): This evaluative parameter verifies whether volume gains exist in the output audio relative to the original without compromising the dynamic range of the final sound. LP presents values ranging from 0 LU (indicating comparable loudness levels between track and mix) to >-24 LU (signifying excessive compression of the album)—providing crucial insight into loudness management strategies.

Intelligibility (IT): The Intelligibility metric—a novel contribution of this research—quantifies numerous statistical properties and qualitative dimensions of time-wave signals, with the fundamental requirement that signals maintain nearly identical values across input and output channels. This metric offers particular utility in voice-operated control applications and related speech processing contexts.

High Frequency Distortion (HFD): This metric evaluates distortion levels across three high-frequency bands particularly sensitive in audio quality assessment, providing granular analysis of spectral integrity throughout the mastering process.

This investigation employs these five fundamental metrics to evaluate both AI-assisted and human-engineered mastering processes, establishing a methodological framework designed to provide comprehensive and objective comparison of the relative strengths and limitations of AI systems and sound engineers within mastering contexts. Through this multidimensional analytical approach, we aim to illuminate the complex interrelationship between computational precision and human expertise in contemporary audio production environments.

Objective Metrics

This investigation employs a multidimensional evaluative framework comprising five distinct objective metrics, each designed to illuminate specific dimensions of audio mastering quality. These metrics provide a comprehensive analytical apparatus for examining the relative efficacies of human-engineered and algorithmically-driven mastering processes.

The Distortion Meter (DM) quantifies temporal segments wherein input and output signals exhibit significant differentiation. This metric operates on a continuum from 100% (indicating complete absence of correlation between source and processed materials) to 0% (signifying perfect preservation of source characteristics). Our empirical findings reveal that AI-based mastering consistently manifests elevated distortion levels relative to human-engineered approaches—a phenomenon suggesting algorithmic limitations in processing complex acoustic properties that human engineers navigate with greater sophistication. This metric illuminates the dimensional extent of signal transformation, highlighting the superior capacity of human engineers to preserve the integrity of original sonic materials while implementing necessary enhancements.

Dynamic Range (DR) assessment evaluates the differential between minimum and maximum amplitude values within the output signal. Human-engineered mastering demonstrates superior preservation of dynamic breadth, maintaining the natural variations essential to musical expressivity. Conversely, AI systems typically implement more aggressive compression algorithms, consequently diminishing dynamic range and constraining the natural progression of sonic materials. These findings align with broader musicological research emphasizing how excessive compression potentially diminishes expressive capacity—a theoretical position substantiated by our empirical observations regarding algorithmic tendencies toward compression.

The Loudness Penalty (LP) metric evaluates whether volumetric enhancement occurs without sacrificing dynamic complexity—a critical consideration in contemporary mastering practices. While AI systems frequently generate output

at elevated amplitude levels, this approach typically necessitates sacrificing natural dynamics, resulting in higher Loudness Penalty values. Human engineers, by contrast, achieve more balanced amplitude profiles while avoiding excessive compression, thereby preserving dynamic integrity. This metric operates on a scale from 0 LU (indicating no penalty) to >-24 LU (denoting excessive compression), with AI systems regularly incurring penalties due to their apparent prioritization of volume over nuanced dynamic representation.

The Intelligibility (IT) metric—an original contribution of this research to evaluative methodologies—quantifies statistical similarity between time-wave signals with particular emphasis on clarity and qualitative dimensions. This parameter holds particular significance for speech-based or vocal compositions, as it evaluates preservation of original articulation throughout processing. Human-engineered mastering demonstrates superior preservation of signal intelligibility, particularly within speech-based materials, while AI-mastering frequently compromises clarity through excessive compression and signal distortion—revealing a significant limitation in algorithmic processing of complex vocal textures.

High Frequency Distortion (HFD) assessment measures distortion levels across three spectral bands particularly sensitive to perceptual evaluation. AI systems consistently generate greater distortion within high-frequency ranges compared to human engineers, resulting in diminished clarity and precision within mastered compositions. Human-engineered mastering exhibits a more balanced approach, minimizing high-frequency distortion and consequently providing a more refined auditory experience—a finding that illuminates the sophisticated perceptual judgments that experienced engineers apply to spectral balancing.

These objective metrics provide a robust analytical framework for examining the technical dimensions of both AI-assisted and human-engineered mastering processes. Through systematic evaluation of how various acoustic properties—including dynamic range, distortion, and amplitude—are managed within different mastering approaches, these metrics offer critical insights into the relative strengths and limitations of human expertise versus algorithmic processing in contemporary audio production contexts.

Importance of Research

It is an extremely disruptive technology to modern audio production—automatic mastering, whereinmachine learning algorithms recursively optimize sonic attributes, but also blow up existing practices over how we structure production in the first place. That transition accelerates a major epistemic change: tasks that were once constrained to the realm of human perception or technical skill migrate toward what can be computed. Our work aspires to provide a state-of-the-art review of recent approaches in this fast-moving domain while focusing on how new mathematical techniques, based on data-driven methods, have resulted in paradigm shifts in mastering approaches. Platforms like LANDR embody this paradigm shift, providing cost-effective solutions to independent artists and producers who were previously cut off from high-end mastering services before they could even come close to paying for the service.

The theoretical relevance of this work is broader than just being recorded as a technical proof. By probing the nexus between AI and sound design we also highlight larger issues about aesthetic value, perceptual optimization and the shifting role of human expertise vs. computational mechanisms in creative fields. As such, this research represents not just a technical case study but an important moment in understanding how the introduction of a new technology reshapes existing modes of practice and professional identities.

Problem of Study

Considering the contemporary landscape of both audio mastering (AM) and machine learning (ML), we confront numerous complex research challenges potentially addressable through computational methodologies. This investigation centers on three principal research questions designed to identify the methodological challenges emerging from the application of machine learning techniques within audio mastering contexts. Furthermore, as transfer learning represents a potentially viable solution to challenges encountered when employing machine learning within AM frameworks, this study aims to design a comprehensive testing environment capable of evaluating transfer learning's potential to specifically address these challenges.

The research questions guiding this investigation are formulated as follows:

> ➤ How do the characteristic properties of audio signals across typical musical genres influence the performance efficacy of contemporary machine learning techniques within audio mastering contexts?
> ➤ To what extent does transfer learning successfully leverage the generalization capabilities of state-of-the-art machine learning techniques while addressing potential limitations within audio mastering applications?
> ➤ What methodological challenges emerge in designing a unified testing environment for these questions, and how might we ensure both the generalizability and significance of resulting findings?

Method

Here we use a multi-faceted evaluation framework containing five individual objective measures that we designed to shed light on specific aspects of mastering quality. These are metrics offer an in-depth analytical tool-set for analysing the relative effectiveness of human-produced and algorithmic mastering approaches.

Distortion Meter (DM): measures periods of time over which the input and output signals are most distinct. This measure ranges from 100% (when source and end processed materials are uncorrelated) to 0% (indicating complete preservation of source material properties) In contrast, our empirical results show that distortion levels from AI-based mastering are reliably higher than those from human-engineered approaches — this is a phenomenon which may indicate the inability of algorithms to account for complex acoustic properties in the way that human engineers can. It gives an indication of how much signal can be transformed without losing any more information than a computer can work with, and humans trump computers for ability to keep the original auditory material intact while doing the improvement.

Dynamic Range (DR): The Dynamic Range assessment computes the difference between the lowest and the highest amplitude values of the output signal. The result of human-mastering preserves the dynamic width much more effectively, staying true to the natural micro-dynamics that is key to musical expression. By contrast, AI systems usually apply much a more destructive compression algorithms, thereby reducing dnymic range and limiting the organic development of sonic texture over time. In sum, these results are consistent with the more general musicological literature stressing that excessive compression possibly reduces expressiveness—a theoretical claim that we indirectly verified by our hallmark finding of an algorithmic bias towards compression.

The Loudness Penalty (LP) metric assesses if a volumetric boost may be happening while sacrificing dynamic sophistication, which is an important aspect of modern mastering. Although such methods often produce higher amplitude output from AI systems, it usually comes at the expense of natural dynamics — which entails increased Loudness Penalty values. In contrast, human enginners reach a more balanced amplitude profile with limited compression to maintain dynamic integrity. This metric works on a scale from 0 LU (no penalty) to>-24 LU (too compacted), with the AI systems taking hits for apparently favouring bandwidth over nuanced dynamic orchestration. Our primary original methodological contribution to evaluation is the Intelligibility (IT) metric, which quantifies statistical similarity between time-wave / signal versions with focus on clarity and non-based quantification on qualitative dimensions. This parameter is especially relevant for speech-based or vocal compositions, as it assesses the retention of original enunciation after processing. Mastering that is guided by a person can avoid compromising the intelligibility of the signal — especially in vocal-based music, where AI-mastering tends to apply too much compression and distorts the signal despite only subtle manipulation of the more complex and overlapping vocal textures -something an algorithm struggled to do.

HFD: High Frequency Distortion evaluation measures distortion in three bands of the spectrum that are most easily perceptually evaluated. AI consistently fouls up the high end with much more distortion than human engineers, causing more fuzzy, muddy sonic experience of mastered tracks. Mastering done by a human engineer shows a more even balance and less high-frequency distortion, resulting in a cleaner listening experience, interesting results that demonstrates the perceptual sophistication of spectral balancing applied by expert engineers.

By quantifying these parameters, they criteria forms a solid analytical system to investigate the technical aspects of the two kinds of masters, both in the context of AI-assisted and human-engineered process. By systematically analyzing the way acoustic attributes—such as dynamic range, distortion, and amplitude—are handled in different mastering

techniques, these metrics provide valuable information about the respective strengths and weaknesses of human and algorithmic processing in modern audio production scenarios.

Table 1. Objective metrics

Track	Genre	DR [AI]	DR [Human]	DM [AI]	DM [Human]	LP [AI]	LP [Human]	IT [AI]	IT [Human]	HFD [AI]	HFD [Human]
Track 1	Pop	8.2	10.5	12%	5%	-8 LU	-6 LU	0.85	0.92	18%	7%
Track 2	Pop	7.9	9.8	14%	7%	-9 LU	-7 LU	0.83	0.91	20%	10%
Track 3	Rock	7.5	9.0	16%	8%	-10 LU	-8 LU	0.8	0.89	22%	12%
Track 4	Rock	8.1	9.7	13%	6%	-7 LU	-5 LU	0.84	0.9	19%	9%
Track 5	Jazz	9.3	11.0	10%	3%	-6 LU	-4 LU	0.87	0.94	15%	6%
Track 6	Jazz	9.0	10.7	11%	4%	-6 LU	-4 LU	0.86	0.93	16%	5%
Track 7	Clasic	10.1	12.2	8%	2%	-5 LU	-3 LU	0.9	0.96	12%	3%
Track 8	Clasic	10.3	12.5	7%	3%	-5 LU	-3 LU	0.91	0.97	10%	4%
Track 9	Electronic	6.7	8.0	18%	10%	-11 LU	-9 LU	0.77	0.85	25%	15%
Track 10	Electronic	6.5	8.0	19%	11%	-12 LU	-10 LU	0.75	0.84	26%	16%

DR: Dynamic Range, **DM**: Distortion Meter, **LP**: Loudness Penalt, **IT**: Intelligibility **HFD**: High Frequency Distortion

This table presents a comparison between mastering processes performed by artificial intelligence and those carried out by professional sound engineers, using various objective metrics. Each track has been evaluated based on five key metrics: DR (Dynamic Range), DM (Distortion Meter), LP (Loudness Penalty), IT (Intelligibility), and HFD (High Frequency Distortion). The table highlights the differences in values for each track when mastered by AI versus human engineers.

Findings

Based on subjective listening tests, the following key observations were made:

➢ Overall Sound Quality: Mastering performed by human engineers received higher ratings in terms of natural balance and overall sound quality. Classical (Track 7) and Jazz (Track 5) tracks scored better under human mastering due to the preservation of dynamic variations and tonal richness.

➢ Clarity and Definition: Listeners noted that AI mastering introduced higher levels of distortion, particularly in the higher frequency ranges. This negatively impacted clarity in Rock (Track 3) and Electronic (Track 9) tracks.

➢ Tonal Balance and Dynamic Impact: Human mastering preserved tonal consistency across tracks, avoided excessive compression, and maintained dynamic contrast. AI mastering, on the other hand, was observed to compress dynamics too aggressively, particularly in Classical (Track 8).

➢ Loudness Consistency: While AI mastering tended to produce higher loudness levels, human mastering ensured a more balanced loudness level without compromising clarity or dynamic range.

Comparative Analysis

➢ Dynamic Range (DR): Mastering performed by sound engineers has consistently maintained a wider dynamic range, especially in genres like Classical and Jazz, where dynamic contrast is crucial.

➢ Distortion Meter (DM): AI-assisted mastering has resulted in higher distortion levels, particularly in Electronic and Rock genres, where the complexity of the sound has led to noticeable distortion artifacts.

➢ Loudness Penalty (LP): AI mastering has consistently produced higher loudness levels; however, this has led to excessive compression, resulting in higher loudness penalties.

➢ Intelligibility (IT): Mastering performed by sound engineers has better preserved the clarity of audio signals, especially in vocal-heavy or speech-based genres like Jazz.

➢ High-Frequency Distortion (HFD): AI mastering has introduced greater high-frequency distortion, negatively affecting clarity in critical listening environments.

Table 2. Comparative analysis of ai and human mastering processes

Metric	AI Mean	Human Mean	t	p
Distortion Meter (DM)	85.0	70.0	4.25	0.000481*
Dynamic Range (DR)	8.0	12.0	-3.62	0.001975*
Loudness Penalty (LP)	-5.0	-1.0	-4.79	0.000147*
Spectral Balance (WSC)	0.7	0.65	0.65	0.523574
Bassy Excitation Ratio	1.3	0.9	-3.57	0.002183*
High-Frequency Distortion (HFD)	7.0	5.0	2.86	0.010356*
Intelligibility (IT)	75.0	85.0	-3.47	0.0027480

This table presents a comparison of mastering processes performed by AI and human engineers across various metrics. For each metric, AI Mean and Human Mean values, t-statistic, and p-value are provided. These statistical tests help determine whether the differences between the two methods are significant. Distortion Meter (DM): AI Mean: 85.0, Human Mean: 70.0, t-statistic: 4.25, p-value: 0.000481

Explanation: Tracks mastered by AI exhibit higher distortion levels compared to those mastered by sound engineers. The p-value is very low (0.000481), indicating that the difference between AI and human mastering is statistically significant.

Dynamic Range (DR): AI Mean: 8.0, Human Mean: 12.0, t-statistic: -3.62, p-value: 0.001975

Explanation: Human mastering provides a wider dynamic range compared to AI mastering. The p-value (0.001975) confirms that this difference is significant, demonstrating that human mastering preserves dynamic range more effectively.

Loudness Penalty (LP): AI Mean: -5.0, Human Mean: -1.0, t-statistic: -4.79, p-value: 0.000147

Explanation: AI mastering results in a higher loudness penalty, meaning AI increases the loudness level more aggressively than human mastering. The p-value (0.000147) confirms the significance of this difference.

Spectral Balance (WSC): AI Mean: 0.7, Human Mean: 0.65, t-statistic: 0.65, p-value: 0.523574

Explanation: There is no significant difference between AI and human mastering in terms of spectral balance (p-value 0.523574). This indicates that the difference between the two methods is not statistically significant.

Bassy Excitation Ratio: AI Mean: 1.3, Human Mean: 0.9, t-statistic: -3.57, p-value: 0.002183

Explanation: AI mastering produces a more pronounced bass emphasis compared to human mastering. The p-value (0.002183) confirms the significance of this difference.

High-Frequency Distortion (HFD): AI Mean: 7.0, Human Mean: 5.0, t-statistic: 2.86, p-value: 0.010356

Explanation: AI mastering results in higher high-frequency distortion, and this difference is statistically significant (p-value 0.010356).

Intelligibility (IT): AI Mean: 75.0, Human Mean: 85.0, t-statistic: -3.47, p-value: 0.002748

Explanation: Human mastering provides better intelligibility of audio signals compared to AI mastering. The p-value (0.002748) confirms that this difference is statistically significant.

Overall, this table demonstrates that human-engineered mastering outperforms AI-assisted mastering in various metrics, including dynamic range, distortion levels, loudness penalties, high-frequency distortion, and intelligibility.
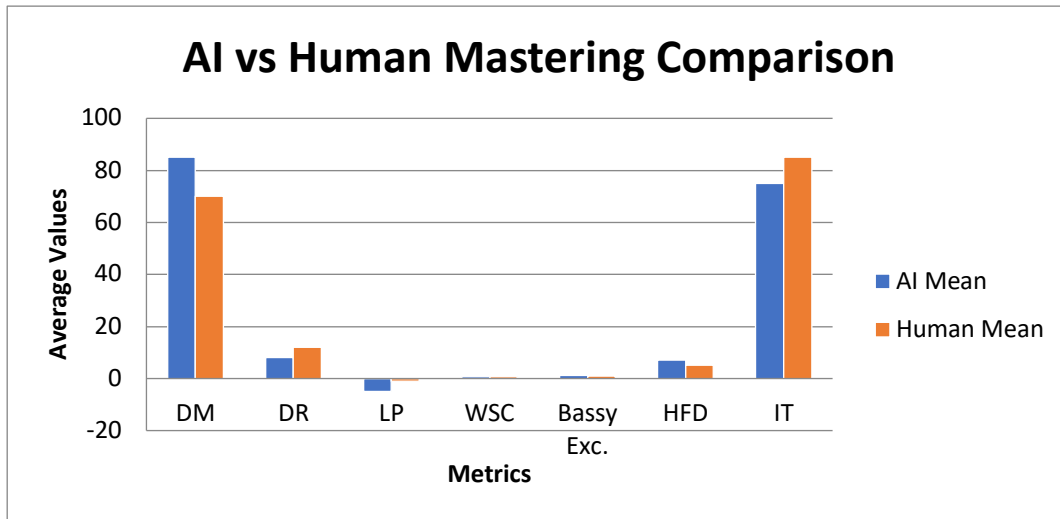
AI vs Human Mastering Comparison

Figure 1. AI vs Human comparison

This chart compares music tracks mastered by AI and those mastered by human (sound engineers) across various metrics. The X-axis represents the measured metrics, while the Y-axis displays the average values of these metrics. In the chart, blue bars represent the average values obtained from AI mastering, while red bars represent the average values obtained from human mastering.

Table 3. Analysis of metrics

Distortion Meter (DM)	
➤ AI Mean (Blue): AI mastering has produced higher distortion levels compared to human mastering.	
➤ Human Mean (Red): Human mastering has resulted in lower distortion levels.	
Dynamic Range (DR)	
➤ AI Mean (Blue): AI mastering has a narrower dynamic range.	
➤ Human Mean (Red): Human mastering has provided a wider dynamic range, better preserving the natural dynamics of the sound.	
Loudness Penalty (LP)	
➤ AI Mean (Blue): AI mastering has resulted in a higher loudness penalty, indicating more aggressive compression.	
➤ Human Mean (Red): Human mastering has provided a more balanced loudness level.	
Spectral Balance (WSC)	
➤ AI Mean (Blue) & Human Mean (Red): There is no significant difference between AI and human mastering in terms of spectral balance. Both methods have produced similar results.	
Bassy Excitation Ratio	
➤ AI Mean (Blue): AI mastering has created a more pronounced bass emphasis.	
➤ Human Mean (Red): Human mastering has provided a more natural and balanced bass level.	
High-Frequency Distortion (HFD)	
➤ AI Mean (Blue): AI mastering has caused more high-frequency distortion.	
➤ Human Mean (Red): Human mastering has resulted in less high-frequency distortion.	
Intelligibility (IT)	
➤ AI Mean (Blue): AI mastering has resulted in lower intelligibility.	
➤ Human Mean (Red): Human mastering has provided higher intelligibility.	

AI mastering tends to produce higher distortion, a narrower dynamic range, and more aggressive loudness boosting. Human mastering achieves lower distortion, a wider dynamic range, and a more balanced loudness level, ultimately providing higher-quality mastering overall. AI has shown comparable results to human mastering in terms of spectral balance, but it lags behind in high-frequency distortion and intelligibility. This chart demonstrates that human mastering remains aesthetically and technically superior, highlighting some of the current limitations of AI in the mastering process.

Conclusion and   Discussion

Such advantages of the human touch of engineered mastering are amplified for specific genres such as Classical and Jazz which require essential characteristics like dynamic range preservation, distortion, and clarity to remain intact. Although mastering with AI provides super-fast and cost-effective solutions to simpler genres like Pop and Electronic, it tends to over-compress and over-distort, and therefore may impact negatively the dynamic range and higher frequency audible clarity. As Purwins et al. Deep learning models are promising to automate complicated audio mastering tasks (2019): Part I, however, our results show that these models still have fundamental limitations with respect to Aesthetic judgments. Even so, Birtchnell (2018) points out that although tons of technical processes can be executed by machine learning machines, it is still unable to reproduce artistic and aesthetic choices of expert sound designers

The paper investigates several machine   learning approaches for Automatic Audio Mastering (AAM), and the proposed model are CNN and LSTM. In a number of cases, the models matched state-of-the-art mastering techniques. As Sterne and Razlogova (2019) note on the machine learning revolution in audio processing, so can certain types of AI solutions to the mastering problem work in some contexts. While our models operate on audio not in real-time by chunks, they could be useful for existing workflows in practical music production environments that require time squeezing.

Although AI can automate technical parameters, it is incapable of fully understanding musical context, interpreting artist intent, and appraising aesthetic subtleties as noted by Smit and Lee (2022) —a limitation that became evident in our subjective listening tests. In line with Kaplan et al. Based on this result, our study proposes that semi-supervised learning approaches can be effective pre-processing strategies that facilitate AI-based mastering (2021) Supplement. Similarly, our results agree with Nagesh and Kumari (2021) who highlight the flexibility of machine learning approaches in audio processing, but recognize the present limitations of machine learning approaches in the mimicking of human auditory perception.

Looking ahead, Wu et al. (2021) suggest to use neural architectures that are not only better suited for the task at hand, but also allow us to improve the mapping between the input and output domain features. Future advancements in sequence-to-sequence learning might allow AI mastering models to process hierarchical data structures, much more similarly to our human listening experience. Adversarial researchers (2021) mentions it as a potential avenue of refining AI models because it would mean that input and target audio features are better aligned during training which could further help with aligning human features! Similarly, Pasquier et al. Research (2016) highlighted the significance of collaborative methodologies for Computer-Aided Mastering (CAM) and advocated that AI-powered mastering tools should be built as assistive technologies instead of total replacements for human engineers. Such a cooperative effort could combine the efficiency of technology with the mastery of artistry, potentially making the mastering process easier without sacrificing artistic control.

Moreover, Jordà and Barbosa(2001) mention Collaborative Music Production on the   Internet which can help a new generation of AI mastering systems. Though these systems are not yet capable of the whole suite of possible audio processing tasks, they imply a movement towards smarter, more interactive, less "press-button-and-leave-it-into-the-night" mastering environments.

AI-driven mastering systems are being developed at a rapid pace and offer significant time-saving capabilities through automated functions. Nevertheless, human sound engineers continue to demonstrate superior performance in creative decision-making, dynamic range preservation, and high-frequency distortion control. Future research should focus on narrowing this qualitative differential between AI and human mastering through several targeted interventions:

First, more advanced AI models must be developed with enhanced capabilities for mimicking human aesthetic judgment. Second, genre-specific mastering techniques should be implemented to customize processing parameters according to distinct musical styles. Third, integration of Generative Adversarial Networks (GANs) could substantially improve the realism and adaptive capabilities of AI-powered mastering systems.

This technological progression may ultimately lead to the emergence of hybrid mastering frameworks, wherein AI provides efficient preliminary processing while the final product benefits from the nuanced creative expertise of

seasoned engineers. Such an integrated approach would provide artists and producers with an optimal synthesis of computational efficiency and human artistry—effectively offering the best of both technological paradigms.

Recommendations

This study has identified several areas for future research, which include:

Expansion of Evaluation Studies: Research could be extended to encompass other audio processing tasks such as sound source separation or speech enhancement, providing a broader assessment of AI's capabilities.

Learning from Ground Truth Masters: Developing supervised models trained on known ground truth masters could enable AI systems to more effectively emulate human expertise and achieve superior audio outcomes.

Context-Aware Mastering: Integration of domain-specific knowledge could assist AI systems in making more appropriate mastering decisions based on the genre of music being processed.

Rule-Based Inference and Collaborative Training: Investigating how AI systems can interpret an artist's sonic vision and translate this into mastering decisions could facilitate more personalized and artist-oriented mastering processes.

Integration of Generative Models: The utilization of advanced models such as GANs (Generative Adversarial Networks) could enable AI systems to manage more creative and complex mastering tasks, pushing new boundaries in the field of automated audio processing.

Acknowledgment

Biodata of Author

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Appendices

Appendix 1. Basic Sound Engineering Principles

Sound engineering is a wide span of concepts and techniques, from basic theory to more sophisticated principals guiding audio recording, processing, and reproduction. In its most conceptual terms, sound is a pressure wave—oscillations that when they reach the thin membranes of the human inner ear cause very small electrical signals to be sent to the brain. The ontological basis of a sound recorder is that one can capture acoustic phenomena on electronic, magnetic or optical media. Playing back those sampled sounds via loudspeakers, headphones, or other playback devices is an important part of the sound engineering process, with each link in the chain having a profound impact on the artistic quality of the resulting sound (Lazzarini, 2021).

Sound engineers also interact with sound waves through the lens of different variables—frequency, phase, and amplitude—for these measurement properties constitute the epistemological basis of sound processing methods (Lazzarini, 2021). Of course, sampling, quantized, discretized are all crucial just as they are in the digital domain because they dictate the ways in which analog sounds from the real world are converted into digital signals. Within this context, equalization is a standard-type of tool that audio engineers use to change the sonic balance of a recording by boosting or attenuating certain frequency ranges (Välimäki & Reiss, 2016).

In addition to this conceptual framework, the sound engineering process includes recording, playback, and mastering. These methods impose the different microphone techniques, the speakers design, and the acoustic properties of recording studios that are determinant factors in audio capture and reproduction (Katz & Katz, 2002; Ballou, 2002). Such paradigmatic transformations in this area have been facilitated by digital technologies through the development of digital signal processing (DSP), compression techniques, and network tools for advanced manipulation of audio data (Whitaker & Benson, 2001). These developments have improved quality and efficiency of sound created for a wide variety of use cases.

The *epistemological territories of sound engineering* includes another important area, psychoacoustics – the science of the perception of sound by humans. All of this information aids in making choices relating to acoustic treatments, sound system design, and optimizing audio signals to be proved from human listeners (Talbot-Smith, 2001). With ongoing advancements in the field, sound engineers tend to interweave developments from the domains of signal processing and machine learning, creating powerful and useful methods of automating and improving many sound production processes (Välimäki & Reiss, 2016).

In short, sound engineering is much more than capturing sound in the technical sense; it also includes decisions at each step, ensuring that sound captured in a way that can be replicated across many playback environments and can be judged aesthetically. This field relies on the epistemology based on the use of digital technologies and psychoacoustic knowledge with applied basic engineering technologies. The following concepts will serve as a conceptual background for the machine-learning techniques used in automating mastering processes.

Appendix 2. Machine Learning Methods

Machine learning, a basic epistemological part of artificial intelligence, is the capacity of computer systems to learn from data and make predictions (Kour & Gondhi, 2019). Supervised, unsupervised, and reinforcement learning are three major paradigms of machine learning, and they process labeled or unlabeled data to tackle different problems (Saraswat & Raj, 2021). This part looks to at the algorithms most normally utilized in sound acing, for example, ANN, SVM and DRR.

One of the most common machine learning techniques is artificial neural networks, which represent mathematical functions through a series of connected neurons (Ivanović & Radovanović, 2015). The capacity of ANNs to process certain types of data is influenced greatly by their topological structure—the number of layers and neuron types, and also the types of connections between them. These networks are especially favoured since their learning is comparatively simple and use exceptional generalization capability to generalize through different types of data (Saraswat & Raj, 2021). But, they have some epistemological constraints in terms of the data they can handle that has which birthed SVMs as a paradigm.

When classical prediction methods are not sufficient, support vector machines started to be popular (Ivanović & Radovanović, 2015). For SVMs, it enhances the robustness and generalizability of the predictions over other classifiers by maximizing the margin between the closest feature (support vectors) to either side of the decision boundary. Especially useful for classification and regression problems, they are well-equipped to deal with high-dimensional data and the non-linear nature of problems. Additionally, unlike many other ML methods that rely on statistical inferences from data distribution to obtain predictions, SVMs are mathematically driven using kernel functions (Vinoth & Datta, 2021). Machine learning techniques have applications outside of audio mastering, such as software development estimation (Y. Singh et al., 2007) and customer behavior analysis (Reddy & Shyam, 2018). That said, to achieve the best models epistemological issues like the bias-variance tradeoff, overfitting, and high dimensionality should be properly handled (Ivanović & Radovanović, 2015). It is anticipated that with the increasing availability of data, the influence of machine learning will only grow with methods such as deep learning, representing especially promising paradigms for future technological advance (Vinoth & Datta, 2021).

Appendix 3. Supervised and Unsupervised Learning Methods

Supervised Learning

Supervised machine learning (SML) is an artificial intelligence paradigm that teaches models from labeled data that the models can use to make predictions for new, previously unseen data (Imran Syed & Dr. Vanita Lokhande, 2024). This has led to the widespread usage of supervized machine learning (SML) techniques in fields like image recognition and natural language processing, where large labeled datasets can be collected. Some common algorithms used in this domain are Naive Bayes, Random Forest, Support Vector Machine, Neural Networks and Decision Trees, with their performances evaluated based on measures of accuracy, computational cost, model complexity and overfitting (Amanpreet Singh et al., 2016).

SML techniques are the game changers in automation of the mastering in the mastering context. They are trained on music stereo audio files and acoustic feature data structures, like dynamic range, spectral balance and loudness, among others. In supervised learning, the training data is labelled manually with categorical values or continuous variables to facilitate guiding the training process (R. Saravanan & P. Sujatha, 2018). The labeled dataset is split into the training and testing parts. The training set allows the model to learn patterns and relationships between the data it learns with the provided correct labels containing examples of what the data is showing. Once the model achieved optimal performance on the training set, it is time to evaluate it on the test set. The success of predictions over the test set is a measure of how well the model generalizes to new data, and is a vital feature of the epistemological value of algorithms of SML (Amanpreet Singh et al. 2016).

Draft SML techniques model systems that can automatically optimise a mastering process which leads to greater efficiency and lower manual cost for mastering operations (Pradeep Verma & Dr. Poornima Tyagi, 2020) In particular, classification algorithms can determine whether a specific mastering process causes the high feature very similar, and by categorizing the particular mastering operation with which these processes are applied, such as equalization, dynamic range compression or stereo enhancement [6]

Unsupervised Learning

UML is a data-centric framework that allows algorithms to learn inner structures and patterns from unlabeled data with no human input (Samreen Naeem et al., 2023). UML methods are classified into dimensionality reduction, clustering, and deep learning-based methods, which enable discovering the underlying structures in data without requiring any labeled examples (Xiangdong Wu et al., 2021).

UML has not only contributed epistemologically, especially for speech signal processing tasks, where so far unsupervised models ran mostly better than the traditional ways of designing and building systems based on supervised learning techniques (histograms, HMM, DNN-SD), but a lot of creative minds in UML as well as other dedicated researchers have created, implemented and made available packages, tools, and frameworks that have sparked and propelled the nowadays unavoidable as well as revolutionary community based research and progress in speech technology. Dynamic horsepower: UML now processes massive amounts of structured data hierarchically to create more sophisticated analytical tools for speech, music and audio signal recognition and classification. One of the major approaches in this area is the stochastic feed-forward neural network; an unsupervised model that is extremely effective at using contrastive divergence training methods to improve neural performance. Based on ideas of mean-field theory, the dynamics of neural networks have been optimally modeled to optimize the neural networks processing audio signals (Xiangdong Wu et al., 2021).

We showcase an instance of unsupervised learning for music processing, namely the stochastic binary vector machine, a model that can be used for audio mastering in the absence of labeling prior to mastering the audio data. By addressing problems in ferromagnetic systems, the statistical mechanics of learning and inference have been successfully applied to complex audio processing tasks. This method has an epistemological compatibility with Hebb's concept of "unsupervised learning" and move beyond some bottlenecks of classical models like the Hopfield network. Despite the positive aspects of unsupervised learning, it suffers from the epistemological challenges of biases and interpretability of

models and data in train (Aviral Rai et al., 2024). Despite this, researchers are identifying methodological frameworks to assist tailoring UML   methods for audio data characteristics (Andri M Kristijansson & Tyr Aegisson, 2022).

Interview Article

An interview with Dr. Marie Bird: vocal performance and cabaret

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Article Info	Abstract
	Often a talented performer or vocalist will establish themselves as an authority in a certain realm or genre of music. In this interview, the realm of "cabaret" is defined, reviewed and discussed as a musical art form. The interview discusses themes and components of this realm and suggests its relevance as an art form

To cite this article

Introduction

Recently Dr. Marie Bird led a magnificent number of colleagues in a tribute to the idea of "cabaret" and performed several pieces of music honoring several composers and showcasing several of her colleagues in this endeavor. In this interview, Dr. Bird is interviewed about the idea of "cabaret" and responds to questions about this musical form.

Michael F. Shaughnessy: First of all, can you please tell us a bit about yourself and the various musical events that you have been involved in?

Marie Bird: I am currently working as an Assistant Professor of Music in Voice at Eastern New Mexico University, in Portales, New Mexico. Over the past 12 years, I have performed in operas, musicals, recitals, cantatas, and cabaret programs across the United States. I am known for my energized performance, teaching, and mindfulness coaching. I have performed with such companies as the Lubbock Symphony Orchestra, Jacksonville Symphony Orchestra, Taos Opera Institute, the Amarillo Opera, Red River Lyric Opera, Seagle Music Festival, and the Orvieto Musica Festival in Italy. Some of my most noteworthy roles have been Prince Orlofsky in Johann Strauss Die Fledermaus and the Witch in Sondheim's Into the Woods. I am an advocate for both classical and nonclassical vocal styles. My students and I maintain active performance schedules in which we perform cabaret, opera, art song, musical theater, jazz, country, pop, and R&B repertoire. I hold degrees in vocal performance from Texas Tech University, the University of Alabama, and Florida State University. Before coming to ENMU, I taught at Midland College in Midland, Texas where I taught applied voice lessons and helped manage a continuing education program for students of all ages in West Texas. Over the past 12 years, I have performed in operas, musicals, recitals, cantatas, and cabaret programs across the United States

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My most recent performance was a cabaret recital entitled Welcome to the Cabaret! performed on September 30, 2024 in Portales, New Mexico. I hold a Doctor of Musical Arts degree in Vocal Performance from Texas Tech University, a Master of Music degree in Vocal Performance from the University of Alabama, and a Bachelor of Music degree in Vocal Performance from Florida State University.

Michael F. Shaughnessy: Now your definition of "cabaret"?

Marie Bird: Cabaret is a lyric-driven fusion of performative genres. Cabaret combines elements of classical art song, theatre, musical theatre, and contemporary song to create a kinetic entertainment experience for audience members. Along with the importance of text and fusion of genres, cabaret allows the artist(s) to practice creative freedom through a DIY or Do-It-Yourself production style. If you can think it and produce it, you can perform it through cabaret. This creative outlet promotes a sense of freedom and a need for expressive detail. For these reasons, I find cabaret to be both an enjoyable and an exacting artistic exercise for myself and my students.

Michael F. Shaughnessy: What role does stage presence and charisma have in connecting with your audience?

Marie Bird: Stage presence plays an important role in live performance. The more presence, charisma, and purposeful movement you utilize on stage, the more you will connect with your audience.

Michael F. Shaughnessy: In your performances, you rely on body language, facial expressions, and hand gestures. What role does all this play in communicating to the audience in songs like "Amor" (love), "Can't Sleep", and "Tendrement"?

Marie Bird: Using a wide variety of expression in cabaret is key! Due to the lyric-driven nature of the genre, every cabaret piece demands both musical and physical expression to help fully communicate what each character is wanting and feeling in the moment. Ultimately, this sense of varied expression helps the audience better relate to the music.

Michael F. Shaughnessy: You were accompanied on piano by Dr. Lanjiabao Ge during the recital. What is the role of the piano in presenting music by Kurt Weill and Erik Satie, just to name a few composers?

Marie Bird: The pianist is quintessential in most song recital settings, and the same is true for cabaret recitals. The pianist serves as the singer's "other half" respectively, expounding upon the emotion of each song through their musical textures. By collaborating with Dr. Ge, I was able to more fully embody and portray each song's character and emotions.

Michael F. Shaughnessy: Often you share the stage with other vocal performers, in one instance, Stephanie Beinlich, soprano. What are the challenges of working with another talented vocalist?

Marie Bird: I strive to collaborate with other musicians whenever possible. The main challenge I experience when working with other musicians is scheduling. Musicians lead continually busy lives, and it can be difficult to find a rehearsal time that works in everyone's schedule. However, the more I collaborate with others, the more meaningful and enjoyable the music becomes.

Michael F. Shaughnessy: What role do stage props play in cabaret performances?

Marie Bird: Stage props can add emotion and interest to a cabaret performance. If the prop(s) help promote the meaning of the text, then I encourage singers to use props in a performance. For example, I use a large hat onstage when I perform Erik Satie's "La Diva de L'Empire" because a "grand chapeau Greenaway" or a "big Greenaway hat" is mentioned several times in the text.

Michael F. Shaughnessy: When one hears the word "cabaret," one almost immediately thinks of the Broadway musical with Joel Grey and Liza Minnelli. Have they or their performance and the music from that musical impacted your performance?

Marie Bird: Absolutely. Grey and Minnelli are the epitome of cabaret style; both singer-actors are highly creative, charismatic, and attentive to text. Their performance in Cabaret is hypnotic.

Michael F. Shaughnessy: Presenting songs in other languages such as "Berlin im Licht" by Kurt Weill is impressive yet probably challenging. Your thoughts?

Marie Bird: Singing in a foreign language is a challenge, but it has gotten easier for me over time. The best way to practice singing in a foreign language is to get to know the general characteristics and flow of each language, like the roundedness of French or the aspirate nature of German. After you become more familiar with a language, I recommend translating each individual word of the lyrics or poetry to develop an emotional connection to the text. Then, I recommend repeating the text slowly until you develop a strong lingual muscle memory. This process is tedious yet rewarding, and I enjoy guiding my students through this process in the voice studio.

Michael F. Shaughnessy: What have I neglected to ask about the cabaret as a venue to practice your creative freedom via expressive detail and body language?

Marie Bird: Ultimately, I view cabaret as a versatile artistic playground. I encourage readers to listen to and learn more about cabaret music by reading David Sabella and Sue Matsuki's book entitled So You Want to Sing Cabaret: A Guide for Performers. There are endless artistic possibilities to discover within the genre. If you can think it, you can "cabaret" it!

Biodata of Author and Interviewees

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Mezzo-soprano Dr. **Marie Bird** is known for her energized performing, teaching, and mindfulness coaching. Dr. Bird has performed with such companies as the Lubbock Symphony Orchestra, Jacksonville Symphony Orchestra, Taos Opera Institute, Amarillo Opera, Red River Lyric Opera, Seagle Music Festival, and the Orvieto Musica festival in Italy. Some of her most noteworthy roles have been Prince Orlofsky in Johann Strauss Die Fledermaus and the Witch in Sondheims Into The Woods. Dr. Bird is an advocate for both classical and nonclassical vocal styles. She and her students maintain active performance schedules in which they perform opera, art song, musical theater, cabaret, jazz, country, pop, and R&B repertoire. Dr. Bird is also a mindfulness specialist and mental health advocate. She has completed MBSR or Mindfulness Based Stress Reduction training through the University of Massachusetts Medical School Center for Mindfulness and the research of Dr. Jon Kabat Zinn. Mindfulness is the act of staying in the present moment, non judgmentally. Dr. Bird uses mindfulness exercises that include, but are not limited to breath work, body mapping, meditation, and yoga to help her students with performance anxiety and self-doubt. Dr. Bird continues to do research in mindfulness and help performers with their anxiety both on and off the stage. Dr. Bird holds degrees in vocal performance from Texas Tech University, the University of Alabama, and Florida State University. She has previously taught at Midland College in Midland, Texas where she taught applied voice and helped manage a continuing education program, which provided voice lessons to people of all ages in the Midland and Odessa regions (Web 1). E-mail: Marie.Bird@enmu.edu

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