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Higher visual art education objectives and teaching patterns to reach them

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Abstract. Visual art education has moved from the traditional studio model towards e-learning practices. This paper presents a comparative exploration of art education goals in research papers (N=48) and among visual art teachers in higher education (N=24), as well as the teaching patterns they use in online practice. We qualitatively analyzed research papers on art teaching goals and interviewed international higher-level visual arts art educators from different countries. The inductive analysis identified many visual art teaching goals and art teaching patterns the teachers used to reach their objectives in e-learning. The analysis connected the overarching learning objectives and art teaching patterns. The paper proposes a visualized model of art education objectives and patterns for art teaching in e-learning. By unveiling and categorizing art education patterns in e-learning mode, this research contributes to a deeper understanding of the relationship between pedagogical strategies and the overarching goals of art education.

Keywords: educational objectives, teaching patterns, digitally mediated education, visual arts education.

1 Introduction

Art education is perpetually developing, keeping up with the rapid changes in professional environments that technology introduces to society. Visual arts education is gradually adjusting to digitization trends, adopting digital art-making [2], digitally mediated teaching [2], and AI-generation tools [3, 4].

Along with technological development, educational goals and practices are going to change. Some researchers point out that the current learning environment does not fully reflect the "changes in society, higher education, and professional practice" [5]. Developing innovative and flexible pedagogical models in design education is necessary in response to the cultural changes that technologies bring [6]. Breaking down the elements of contemporary visual arts and design education, we still have

a limited understanding of educational objectives in visual arts education (especially in an online environment) due to the lack of published literature. Additionally, teaching strategies for reaching educational objectives in visual arts did not receive enough attention from research. The shift to an online art and design education environment is understudied [6, 7].

The challenges of online teaching are evident in higher visual arts education [8]. With digitization and the recent pandemic, educators are expected to cater to students' needs online. Proper training and support are often needed for instructors transitioning their visual art course contents from face-to-face to online settings [9, 10]. Teachers who used face-to-face teaching strategies in online environments reported dissatisfaction with the lesson flow and were less likely to enjoy remote teaching [11, 12]. Some research suggested that instructors should use a mixture of content, pedagogy, and technology while designing online courses [13]. Teachers who worked with students online also reported having problems with a range of art teaching activities, including practical demonstrations, building up emotional connections in a group, stimulating students' activity, and creating course content [14, 15]. The research highlighted the need to support art educators during their shift from on-site teaching to online [16] by writing up and sharing the most successful teaching practices in online higher visual arts education.

The problems of e-learning in art lessons appear because art education has been centered around a studio model for centuries; replicating this model online is challenging. The studio model is based on experiential situational learning, where students in a project-based mode imitate real-life situations and create designs, artworks, and prototypes. Traditionally, the work in a studio revolves around an experienced artist who gives feedback to students' work ("desk crit") and guides the creative process. According to some research, the studio model is no longer relevant to societal changes. Art education should include newly emerged technologies to comply with the art industry's development [5]. With the transformation of the studio practices, more research is required to study in-depth the pedagogy of the design studio [17]: "There is a need to provide adequate theories for contemporary pedagogical practice so that design teachers can more clearly articulate what they do and why." The critique highlights the lack of clearly defined objectives in some schools and the tendency to imitate the real art world in classrooms instead of a considerate and structured teaching process [18].

Understanding and critical reflection on their teaching practice might be helpful for artists leading educational programs at universities. Examining the experience of other educators is a way to enrich their practice [17]. The presented paper aims to structure and crystallize information about educational objectives and teaching practices at a higher level in online educational settings. Information about educational objectives might be used for planning courses and curricula, and information about educational patterns could help art teachers design the learning

process. Thus, the presented article explores educational objectives in higher visual arts education and teaching patterns used to achieve them in digitally mediated settings. We extracted the educational objectives in art lessons, grouped them, and compared them with papers about art education. The paper also maps art educators' teaching practices in e-learning situations. Structuring educational objectives and patterns could clarify contemporary art education in the 21st century. For that, we formulated the following research questions: (1) What educational objectives do art teachers have, based on published research papers and the practitioners' experiences? (2) What teaching practices do art teachers employ to reach their objectives?

The article aims to emphasize the teaching patterns that reflect a newly adopted online educational environment. Technologically augmented learning ecosystems are expected to expand in the decades to come, and teachers have to keep up with the technology's development. The article targets condensing art educators' COVID-19 teaching experiences, looking at the meaningful use of teaching patterns and technological elements used in teaching patterns.

1.1 Research background

Neil Mulholland [19] claims that there are two primary questions in contemporary art education: what to teach and how to teach. These questions are connected to the core question: why teach? What are the goals that educators want students to achieve? With clear objectives in mind, teachers choose the subject (what) and the method (how) of future courses, workshops, and programs. Defining educational objectives is crucial for teachers to create effective programs, courses, and lessons [20–22]. Educational objectives are broad statements representing the expected achievements students should attain while studying [23]. Education should result in knowledge, skills, and capabilities students should have by the end of the lesson, course, or program [24], and the final purpose of higher education is to prepare students for professional activity [25]. Defining an educational objective, Ammons [20] derived several qualities: it should describe desired student behavior with the content for developing this behavior and provide a way to form the classroom teacher's instructional decisions. The educational objectives might also be defined according to Tyler's rationale [26] as an explicit formulation of expected changes in behavior under the influence of the teaching process [27].

Several authors published recommendations on writing educational objectives over half a century ago [28, 29]. The core of any objective is the description of the expected behavior or performance of the learner that includes a verb or an operational noun [30]. The hierarchy of the verbs then gradually goes from simple to more complex activities. The selection of educational objectives for a course or curriculum includes specification, classification, and organization of educational

objectives [31]. Overall, the way to define objectives lines up with the personal taste of an educator; the difference is in the degree of precision in how the objectives are described. Tyler [26] sets only two components in the objective description: expected student behavior and teaching content; Mager [28] adds the conditions for the behavior and assessment standards to the formula. Gagne and Briggs [32] defined five components: action, object, situation, tools, and performance the learner is expected to demonstrate. The term "Educational objectives" is blurred; objectives might be written regarding teaching intention and formulated regarding expected learning outcomes [33, 34]. In recent research, the term "learning outcomes" is used in connection to the student-focused teaching model. Learning (teaching) outcomes differ from educational objectives; they are concerned with the learner's achievements rather than the teacher's intentions [35]. Learning outcomes are statements of what a learner is expected to know, understand, and can demonstrate after the completion of a learning process [36]. We use the broader term "educational objective" for this article.

The use of objectives in education has raised multiple debates. The main argument against using objectives is that they are restrictive and inflexible, incompatible with opportunistic teaching. Another critique is focused on the fact that rigid objectives discourage creativity and spontaneity; while some objectives might be ambiguous, others would be over-specific [30]. However, the meaningful usage of objectives comes from matching objectives with relevant teaching and assessment strategies. Objectives might also be a 'source for teaching and learning, rather than as a set of blinkers or restraints' [37].

A range of taxonomies has been developed to categorize educational objectives. An overview of the most taxonomies used for the classification of educational objectives is beyond the scope of this study; previous rigorous work summarised the most important parts of the existing taxonomies [38, 39]. With extensive scholarly effort on the general taxonomies of educational objectives, research has yet to be conducted to propose a system for visual art education. Research on learning outcomes proposes their classification based on knowledge about the subject discipline, skills particular to this discipline, and generic skills (that can relate to other disciplines): writing, speaking, problem-solving, using technologies, and teamwork skills. Generic skills are essential because they increase the chance of professional success after graduation [35]. Art education offers a distinctive way of knowledge sharing, with visual representation as the core element. Various knowledge types require different knowledge representation techniques [40]. Visual representation of knowledge might have specific educational objectives to train students to operate. Design professionals rely on a specific set of cognitive, strategic, and practical procedures while working with a visual representation of knowledge, identified as design thinking [41]. Different authors use various classifications of steps included in design thinking, but the overall structure is an

iterative interchange of divergent and convergent phases [42]. Using a Double Diamond design thinking model might be a way to organize educational objectives connected to visual representations. The Double diamond model consists of four main stages: initial research (Discover), problem framing/synthesis (Define), ideation (Develop), and implementation/prototyping (Deliver) [43].

Successful curriculum development has four stages: selection of educational objectives, selection of educational experiences, organization of educational experiences, and evaluation of educational outcomes [44]. The selection and organization of educational experiences consist of repeating actions aimed at solving problems, and those actions are educational patterns. The concept of educational patterns might be used for the selection and organization of educational experience phases. Educational pattern theory comes from a very influential book, "A Pattern Language," by Christopher Alexander [45]. The author presented a way for architects to solve problems in a defined context using solution patterns that encapsulate the best practices known for the expressed problems. Researchers adopted the pattern theory for the educational context, and various studies have explored various educational patterns [46–49]. Fioravanti and Barbosa [50] assembled more than 300 educational patterns published previously. The main body of work about educational patterns was published before the technological explosion, so more research is required to explore teaching patterns with contemporary technologies (online education and artificial intelligence systems) [51]. Educational patterns are central to building e-learning systems [49]. Even with the interdisciplinary nature of teaching patterns, it is considered that every discipline would adjust them for their needs. Research on patterns in art education is humble [5, 52], so more studies should be carried out to cover the existing gap.

2 Methods

2.1 Systematic literature analysis

The first research question focused on the educational objectives of visual arts education. Working with the published literature was done according to the qualitative document analysis principles [53]. To identify a list of objectives in published literature, we initially started gathering articles about educational objectives in visual arts. Due to the absence of journals dedicated to the topic, this study did not focus on analyzing a particular set of journals. For the initial search, we used the Google Scholar publication search engine. The other sources included the Tallinn University Library collection, ACM Digital Library, IEEE Xplore Digital Library, ISI Web of Science, Scopus, and Springer Link. We used search keywords: "art education learning outcomes," "art education goals," "art education aims," and

"art education objectives." The search was conducted in three rounds. An analysis session followed every search session. We stopped adding articles when search results did not give any results. One researcher did the procedure, taking approximately two months to complete (June-July 2022). An additional round of search and consequent analysis was performed in December 2024 to enrich data with the newest publications. We used the following inclusion criteria to add articles to the study: 1) The text is in English. 2) It contains a list of objectives that art teachers should aim to achieve. 3) It is dedicated to objectives either in general or higher education level. 4) The full text is available for downloading.

Table 1. Articles included in document analysis.

Analytical approach	Higher education	General education
Theoretical work, descriptive article	Eisner (1973), Owen (1998), Carroll (2003), Pouls (2019), Lu (2020), Yadgarov (2023)	Norris and Goodwin (1971), Fosler (1975), Efland (1976), Stankiewicz (1980), Johnson (1982), Amdursky (1983), Greer (1984), Eisner (1987), Hermans (1991), Stake (1993), Delacruz and Dunn (1996), Eisner (2001), Koopman (2005), Hwang (2006), Delacruz (2009), Hebden (2009), Seidel et al. (2009), Zande (2010), Ecoma (2012), Lehtonen et al. (2013), Mannathoko (2019), Siegesmund (2023), Sheridan et al. (2023)
Document analysis		Chia (1993), Chen(2019), Lian (2019), Al-Amri (2019), Schwarz and Muller (2019), Kallio-Tavin (2019), Hernandez-Hernandez (2019)
Quantitative studies	Denac and Cagran (2012)	Loveridge (1988), Torres de Eca et al. (2017), Udeani and Kayode (2018)
Qualitative studies	Barrett (1988)	Bullock and Galbraith (1990), Lam (2000), Phelps and Maddison (2008), Benzi (2016), Fendler and Hernandez-Hernandez (2019)
Mixed methods		Wilson et al. (2008), Page (2018)

In the end, 48 articles were included in the study. Articles were published from 1971 to 2020, with 8 articles about higher education and 40 about general. The authors wrote about educational objectives in specific countries: the USA (N=23), the UK (N=5), China (N=5), the Netherlands (N=3), Finland (N=3), Spain (N=2), Singapore (N=2), Australia (N=2), Nigeria (N=2), Germany (N=1), Portugal (N=2), Denmark (N=1), France (N=1), Greece (N=1), Italy (N=1), Uzbekistan (N=1),

Argentina (N=1), Brazil (N=1), Oman (N=1), Botswana (N=1), Canada (N=1), Korea (N=1), Turkey (N=1), and Slovenia (N=1). The country count is misaligned with the article number because some of the papers reported several countries. Table 1 demonstrates the variety of articles in the sample. Articles are not only classified by education level but also grouped by study type. Most articles contained theoretical developments and descriptions of the author's position. Another significant group is articles based on document analysis (curricula and regulations). The third group consists of quantitative research results, the fourth is qualitative analysis, and the last is mixed methods studies.

For data analysis, we saved text files on the local hard drive. We used qualitative principles for data analysis [54]. The articles were uploaded into the qualitative coding software Alas.ti and manually coded. Inductive coding was used (in vivo method and process coding), so the code names copied the content of the highlighted quotations. The second coding round included merging similar codes based on the names to reduce the number of codes. Additionally, we ensured that every article contained one instance of a code except articles that reported the objectives of several countries. Next, codes were inductively classified. Data from coding was exported as an Excel spreadsheet, and the Python library (Plotly Graphical Objects) was used to visualize the results (Visual Studio code).

2.1 Interviews analysis

A series of open-ended interviews were carried out. We used both purposive and snowball sampling methods to look for participants. All participants (N=24) were art teachers with active artistic careers and tenure positions at various universities, particularly: Austria (N=8), Estonia (N=4), Russia (N=3), the USA (N=3), China (N=2), Finland (N=1), Germany (N=1), Lebanon (N=1), and France (N=1). All teachers switched to online lesson delivery during lockdowns. Male and female teachers participated (gender was distributed equally); some were working with new media (14), and the rest were working with analog media (10). Teaching experience varied from more than 20 years to recent graduates. Educators did not have any financial incentive to participate in the study.

Interviews were conducted online (Zoom) and face-to-face; voice recordings were transcribed (Otter.ai, Descript). Most of the interviews were in English, and two were in Russian. Russian language interviews were translated manually by the interviewer. As this study focuses on the art educators' experience, we designed a list of open-ended interview questions. The overall character of the interview was a natural exploratory conversation. For this study, the interviewer asked: 1. Could you describe one of your recent digitally mediated lessons? 2. What did you think about when you were planning the lesson? 3. What objectives should art students be able to achieve during their studies? We sent the interview questions to the

participants in advance so they could prepare for the interviews. Interviews were conducted from October 2021 to June 2022, with one additional interview in September 2023.

We manually checked the quality of all transcripts and edited the text where the software made errors. Further, the texts were analyzed using qualitative analysis software (Atlas.ti). The first coding round was done inductively, and teaching patterns were named using a short description of educational activity. In the subsequent stages, we united codes with similar meanings. We read interviews thoroughly several times to check the coding quality and not to miss important information. A second researcher would also look through selected interviews to ensure coding quality. We used groups and code names derived from the previous stage, literature analysis, looking for educational objectives. In cases where the objectives mentioned by participants did not match any existing codes, we created new codes. Lastly, we paired objectives and patterns mentioned in the same interview (only in cases when the participants pointed out the connection between them).

2.3 Additional procedures

We employed triangulation of data; diverse sources of evidence (document and interview analysis in our case) are supposed to introduce more reliability to the qualitative research [55]. In VS code, we loaded separate XSLX files with the document and interview analysis results in a Python (Jupyter) notebook. We used visualization as a method to compare the results.

We paid close attention to ethical considerations. At the beginning of the interview, all participants became familiar with the research conditions and consented to participate. All participants were adults. Personal data such as names, email addresses, and places of work were stored in a separate file on a research laptop to ensure the complete anonymity of the participants. The recordings were labeled according to the participant number, media used, and country of work. Participants had a right to withdraw their data from the study. The recordings were stored on the research laptop until the end of the study. The copy of the files was saved on a separate, protected hard drive with a password that was kept in the research facilities at the university.

3 Results

3.1 Art education objectives in literature and empirical data

The analysis of published papers and interviews displayed a wide range of educational objectives that might be set for students to achieve. The results revealed 60 objectives relevant to art education; 25 were unique to interviews, 13 were unique to papers, and 22 were mentioned in both sources.

After several rounds of inductive analysis, we identified nine themes that would unite objectives into groups. The first group targeted factual (declarative) knowledge transmission (Knowledge) (N=4). The second group (N=8) included objectives connected to culture, society, and national identity (Cultural). The third group was directed at the student's cognitive abilities and everything connected to working on a more abstract level (Idea-oriented, N=13). The fourth group included all objectives targeted at practically implementing knowledge and idea-generating processes (Object-oriented, N=8). The fifth group focused on students' ability to use digital tools (Technological competencies, N=3). The sixth group consisted of objectives related to stimulating Collaboration in a classroom (N=3). All objectives in the next group had shared concerns about a student's emotional state; we named this group Affective (N=5). Finally, two groups had objectives dedicated to Personal and Professional Development (N=8 and N=9, respectively).

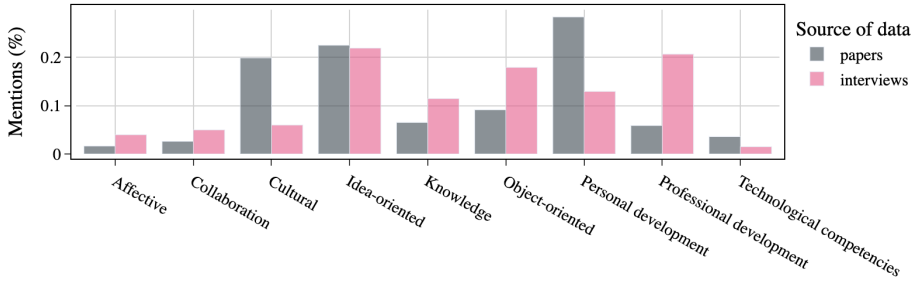

Fig. 1. The percentage of educational objectives mentioned in papers and interviews.

Additionally, we calculated the distribution of objectives mentioned in both sources (Figure 1). Looking at the proportion of every objective group in the data might signal which group is more important for educators and which objectives they prioritize during lesson and course planning. As might be noticed in Figure 1, research papers and interview data prioritized different objective groups. Papers highlighted the importance of the Personal development group (28 percent), the Culture-related group (19 percent), and the Idea-oriented group (22 percent). Art

teachers valued most Idea-oriented objectives (22 percent), Professional development (around 20 percent), Object-oriented (17 percent), Personal development (almost 13 percent), and Knowledge (11 percent). Thus, some groups seemed more important for teachers (Idea-oriented, Professional development, Object-oriented, Knowledge, Collaboration), while others were central for researchers (Personal development, Cultural, Idea-oriented).

The proportion of objective mentions was very balanced for the Knowledge-oriented objective group (Figure 2). Both data sources emphasized the importance of knowledge acquisition. The objectives elaborated on the information students should internalize — art history, theories, and the interdisciplinary relationship between art and other disciplines. Interviews featured an objective not discussed in the paper sample ("Know Anatomy"), which might be essential for depicting a human image in analog and digital media.

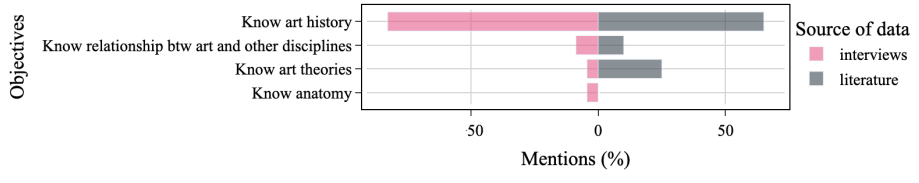

Fig. 2. Knowledge-related educational objectives in interviews and papers.

The Cultural group stood out from the rest because, in the initial analysis rounds, only papers mentioned this objective type; moreover, it was the second most mentioned group (22 percent) in the paper sample. The objectives included: "Communicate Culture," "Understand Cultural Complexity," "Understand Society," "Respect the Environment," "Express National Identity," "Respect Cultures," and "Shape Culture." Even a text search of the words "culture" and "cultural" in the interview data resulted only in a program name and its description; some phenomena like "male culture" and "Internet culture" were mentioned as well. We suggested that contemporary art educators might use other terms for expressing cultural aspects; when describing art creation, interviewees used the term "context" quite often. 12 participants used the term "context" referring to cultural awareness, connection between students' art and local and global art histories, historical events, and society. So we believe that practicing art educators might use vocabulary different from researchers.

Even though the Idea-oriented group is the only group that both of the sources treat with the same attention, the group revealed discrepancies in educational objectives between papers and interviews (Figure 3). Discussing artworks was mentioned in papers more often than in interviews. It was the second most important objective, according to papers. This objective suggested that students should "Evaluate Art," "Critique Artworks," and "Talk about Art." Developing visual

perception is an objective that was never mentioned in the interviews but had a significant number of mentions in papers. This objective was described as "developing the visual sensitivity to see and describe the subtle and complex qualities of both visual art and the visual environment." The student's ability to "Reflect on Work" was mentioned to the same extent as "Understanding Artistic Processes" (14 percent). Interview data revealed that several educational objectives were not mentioned in the paper sample. Art teachers wanted students to know what is important to them, why they make some art choices, and "what they want to tell the world with their art." "Objectives "Analyzing Images," "Thinking Algorithmically," "Comparing Ideas," "Recognizing Topic Importance," and "Understanding Storytelling Principles" appeared only in the interviews. Some objectives in the group ("Develop Ideas" and "Develop Thinking") target cognitive abilities related to conceptual thinking. The difference is that art educators emphasize generating, mixing, separating, improving, and articulating concepts that would become a base for future artworks ("Develop Ideas"). Papers emphasized the importance of the development of conceptual thinking ("Develop Thinking"), which in turn would enable idea generation and development. Practitioners elaborated on developing thinking in more detail; for example, some art teachers from this group pointed out that students should be able to "synthesize information," "structure thoughts," and "think critically about art."

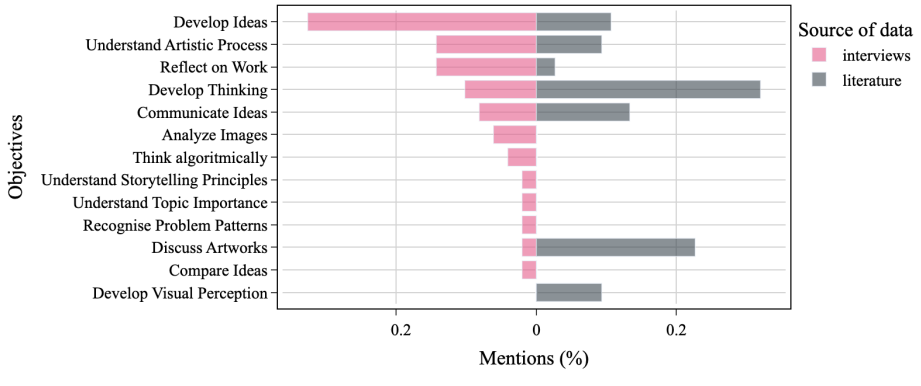

Fig. 3. Idea-oriented educational objectives in interviews (N=12) and papers (N=7).

Both sources paid attention to Object-oriented objectives (Figure 4). Papers and interviews valued artwork production and design principles application; papers mentioned more art project work ("Do and Plan Art Projects"), while interviews gave more attention to extending art students' proficiency with a large variety of media. "Understand Media/Use Different tools" comprised objectives like "reveal to them the ways they can draw," "use a variety of software as a palette," and "integrate older technologies in their practice." Interview participants mentioned particular

objectives that did not appear in the papers: “Draw in Digital Media,” and “Develop own Tools.” Visualizing ideas differs from “Drawing on Paper and in Digital” because it involves creating prototypes and mood boards for future projects. “Developing own tools” is a very particular objective because some teachers want their students not to use existing software but to experiment with creating their code that would fit the exact requirements of students’ creative intentions.

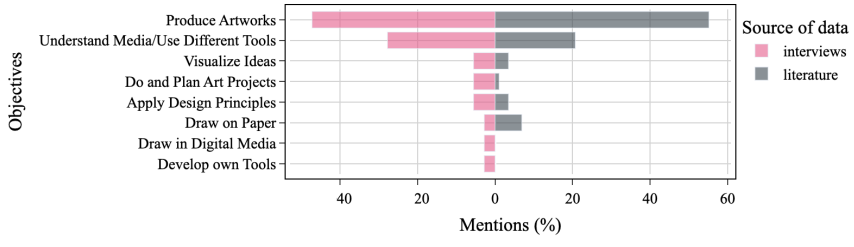

Fig. 4. Object-oriented educational objectives in interviews (N=8) and literature (N=6).

The following three groups had the lowest mentions in the data, so we did not include detailed visualizations. The Technological competency educational objectives group highlighted the importance of students being innovative, using technology to adapt to world development, and critically understanding artificial intelligence. Papers mentioned the technological competencies-related objectives three times more often than interviews.

The Collaboration-related objectives are focused on communication within the study group and the co-creation of artworks (“Develop Paragogic Dynamics,” “Foster Collaboration,” and “Support Interdisciplinary Collaboration”). Papers mentioned this group two times less than interviews. The Affective group of objectives includes all objectives connected to emotional states. Papers revealed only two objectives in the group, “Manage Stress” and “Value the Role of Art.” Interviews added that students should “Connect Emotionally With Artwork,” “Keep Motivated,” and “Manage Emotions.”

Personal development was the most addressed group of objectives in the papers and the fourth most mentioned group in the interview data (Figure 5). The objectives in papers and interviews diverged significantly. Papers reported the importance of developing creativity, growing personally, and developing morally and intellectually. The objectives from papers were more abstract, whereas practicing teachers preferred more calibrated objectives definitions. Interview data paid more attention to “Self-directed Learning,” “Discover Aptitude,” and “Build up Confidence.”

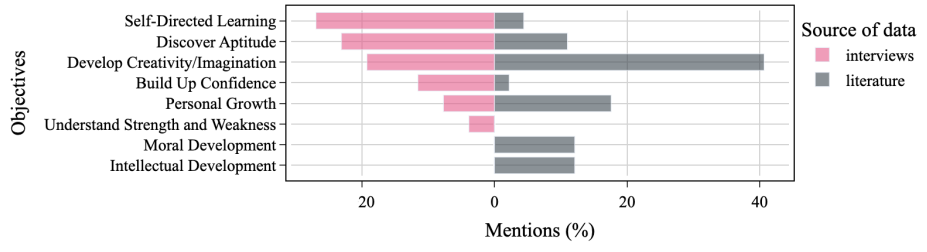

Fig. 5. Personal development educational objectives in interviews (N=6) and literature N=7).

The Professional Development Objective Group was essential for teachers. Professional Development Objectives are directed at the student's career growth; they imply participation in "real-life" art world events (Figure 6). The sample papers mentioned broad objectives, such as "Prepare for Career" and "Use Art in Life." Interview data described more specifically what preparing for a career means: art students should be able to "Find artistic identity," "Demonstrate artworks (online and offline)," "Know how art institutions work," "Write artistic statements," "Create a portfolio," and "Apply for grants." The objective "Connecting Research and Artwork" was mentioned twice more in the interviews than in the papers. It reflects the contemporary trend of visual arts and the rise of artistic research in the last decade [56]. Artists are considered knowledge producers, so art students are expected to "understand research methods," "conduct research," and "be able to write a dissertation."

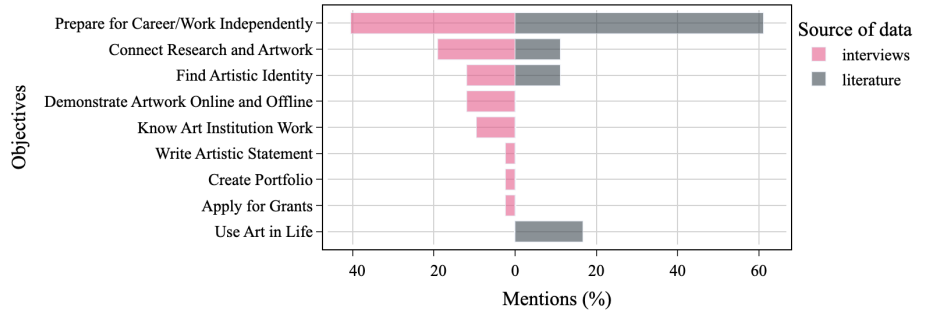

Fig. 6. Professional educational objectives in interviews (N=8) and literature (N=4).

When comparing two sources (published research papers and interviews with art teachers), we witnessed a significant discrepancy between the art education objectives in theory and professional teaching practice. Interview data introduced many educational objectives that did not appear in the paper sample. Furthermore,

interview data stressed different objective groups, focusing more on idea-oriented, professional development, and object-oriented educational objectives. Papers highlighted personal, cultural, and idea-oriented development objectives.

3.2 Educational objectives and teaching patterns in visual arts education

After several rounds of close reading and coding interview data, we extracted 84 educational patterns teachers use in their digitally mediated lessons. Based on the data, we connected patterns with the objectives mentioned in the same interview (examples of coded cases can be found in Table 2). Links between codes were created based on teachers' explanations when they used logical connectors in speech. Example structure: "I do _____, so student will _____." Not all patterns could be explicitly traced to an educational objective. Out of all patterns, 55 were linked to objectives. We visualized our findings in a Sankey diagram with arrows directing from educational objectives to teaching patterns (Figure 7). Nodes on the right side of the graph represent teaching patterns, and nodes on the left represent educational objectives. In this graph, we included only objectives and patterns that could be linked based on interviews. Nodes are depicted in the current order, from top to bottom: Knowledge-oriented (yellow), Idea-oriented (pink), Object-oriented (red), Technological competencies (dark green), Collaboration-oriented (blue), Personal and Professional development (dark and light orange). Links between nodes are colored in the lighter shade of a parent node. Links are not weighted; measuring the pattern usage frequency was out of the scope of the study. Measuring the objectives' frequency was visualized in the previous subsection. Hence, a node size only varies to demonstrate the number of connections: the more links a node has, the bigger its size.

Table 2. Examples of coding with patterns linked to an educational objective.

Example	Objective	Pattern name
"We have to understand which kind ofresearch methods are out there, and which kind of methods could be used as tools for us."	produce artworks	incorporate research
"(Students should) paint and talk about their work... (in my lessons) Students show their recent work, and we discuss it in the group."	produce artworks	group crit
"I can correct my students, or find some references of artists with a similar style, so a student can compare his artwork with a professional one and analyze what he should do to get closer to it."	produce artworks	show references

"For the next lecture, students have to bring at least 3 ideas. And they have to present them. And then they combine two of them or all three into one concept."	develop ideas	mix ideas
"But in painting and drawing is also very important to see it in life; to go into a museum to go into a gallery, and you cannot get all the information from a picture. But you cannot feel the sensual part of art."	connect with art	visit museum
"I show previous inspirational work from history, that's one way to stimulate their creativity."	develop creativity	interdisciplinarity

The graph demonstrates that teachers sometimes use the same teaching patterns to achieve objectives from different groups; for example, the pattern "hands-on approach" is used for creating a portfolio (professional group) and for producing an artwork (objective-oriented group). The most common patterns were "read a lecture," "show references," "ask questions," and "feedback." The most common feedback patterns were "personal conversation" and "group crit" (a widely used term for the blend of learning and assessment in the visual arts and design [57, 58]).

The description of teaching patterns is beyond the scope of this study due to the extensive number of patterns. Some were introduced in recently published work [52]. Researchers suggested that patterns could be classified into similar groups as we classify objectives in this study. The present study pointed out that although art teaching patterns might be grouped, they are universal because many patterns were mentioned for achieving objectives belonging to different groups (more than half of the discovered teaching patterns). Another addition to the relationship between art teaching patterns and objectives is that we witnessed teachers using some objectives to achieve others. For example, the objective "Draw on Paper" was mentioned to achieve another objective, "Understand Media" (it is the only red node on the right side of Figure 7). The visualization settings did not support several column layouts, so some connections were omitted. For instance, an Object-oriented objective, "Do Art Projects," was mentioned to achieve a professional development objective, "Create Portfolio."

3.3 E-learning patterns in higher visual arts education

Figure 7 provides evidence that art educators in online lessons use a mix of familiar patterns with new patterns that work only in digitally mediated lessons. (marked with *). Table 3 demonstrates patterns that were not depicted in Figure 7. Digital

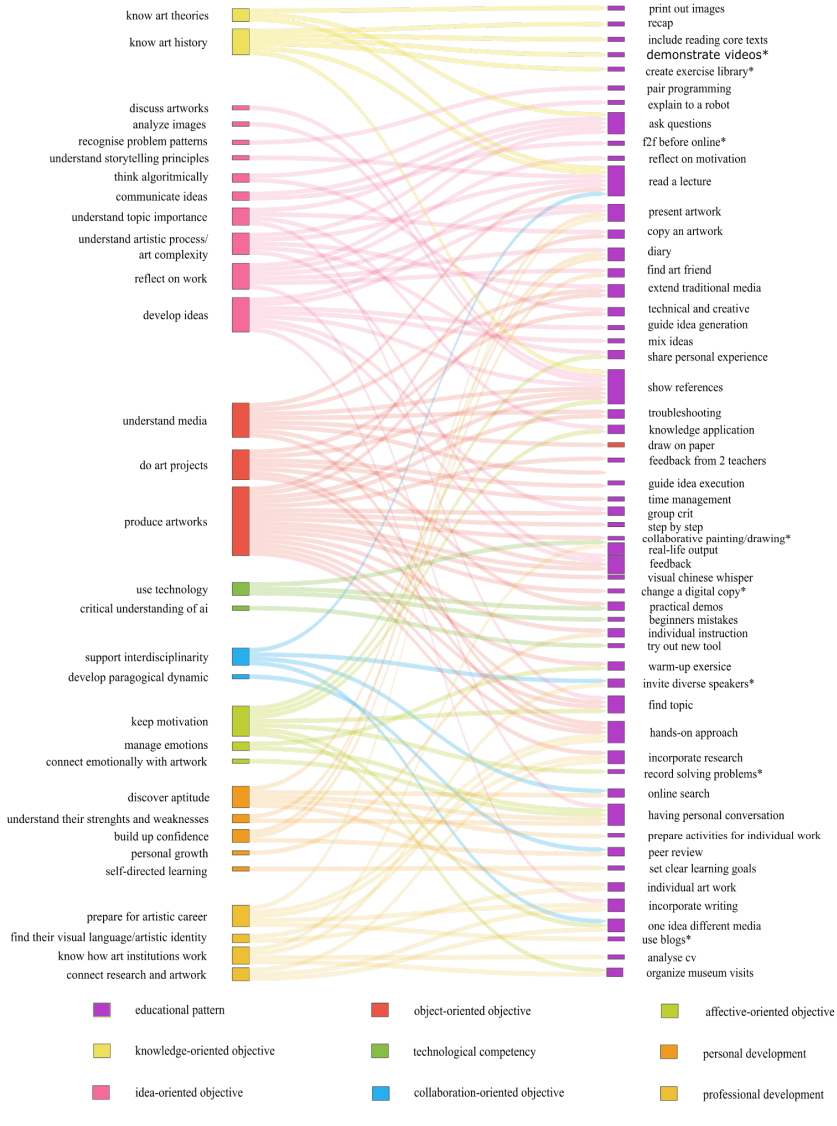

Fig. 7. Educational objectives (on the left) and teaching patterns to achieve them (on the right).

mediation patterns were employed to soften the adverse effects of online education (like low student engagement, less emotional involvement, and screen fatigue). Teachers reported substituting long classroom workshops with well-structured LMS courses with diverse, shorter activities. Having fewer chances to meet students

on campus and answer their questions occasionally, teachers record training and solution videos and share them with students on LMS. When online teaching hinders art demonstration, they set up multiple cameras and switch between them. Teachers keep a separate forum/dashboard where students can post questions and comments to ensure fewer interruptions to the lecture flow. Teachers include blogs and social media to stimulate student communication with each other and the art community during lockdown. Sharing artistic processes might positively impact students' motivation to work.

Digital-mediated teaching patterns did not appear to connect strongly with particular objectives. Objectives that employed digital patterns: Know art history ("create exercise library"), Produce Artworks ("change digital copy"), Keep Motivation ("record solving problems"), and Prepare for Artistic Career ("use blogs"). Some objectives (knowledge-oriented) were reported to be easier to achieve online, and technology was used as a mediator. Other objectives (object-oriented) required restructuring lessons and courses, and technology was used more creatively to negate the complications of online learning.

The patterns that were not connected to objectives are different. Patterns that help to reach an educational objective shape the content of a lesson; students will perform various activities - present an artwork, write a short text about it, discuss it, make a sketch, etc. Patterns that involve a digital transformation mostly affect not content but lesson form. A teacher is the main actor in these patterns, and using these patterns, the teacher creates a perfect online stage for a student to perform activities and follow teaching patterns that are connected to educational objectives. In a sense, digital teaching patterns create an invisible scaffolding to soften the hardships of online education for teachers and students alike.

Table 3. Teaching patterns emerged in online education.

Teaching pattern	Problem	Context	Solution
Cocktail of activities	Student are disengaged	When a teacher gives the same lecture they prepared for offline class, but over a video conferencing software, students lose focus easily	Rearrange a lecture into a patchwork of shorter activities
Saving the online work progress	Interaction traces in digital lessons are lost	Links, images, and messages are a crucial part of online discussion. At the end of an online session chats disappear	Use software that saves chats and documents online work (e.g. MS Teams)

Multi-camera setup	The front camera cannot show how a teacher is drawing	During practical art lessons, teachers have to demonstrate not only slides and faces but also some parts of the creative process	Set up several cameras with good light and switch between cameras
Drawing from the camera	Students do not share the same visual environment studying from home	In life drawing classes for skill training it is important to improve motoric response to visual perception	The teacher uses the image captured by laptop cameras so students can either sketch each other or something from the teacher's screen
Pre-recording videos	Student are disengaged	Lecturing over video conferencing software is more challenging	Teachers record lecture snippets so students watch them before a study session. Study sessions would be used for discussion or other activities
Using a dashboard	Lecture flow is easily interrupted	Online lecturing is easily swayed, so when students ask questions in real time there might be a slight disruption.	Students post questions to a separate dashboard (Padlet), and the teacher addresses all questions after the lecturing block
Mixing analog and digital	Students art is biased by technological affordances	Students are excited to try new tools, so they create not what they envision but what tool could do	Before students start creative coding they should visualize ideas on paper
Step-by-step instructions	Students cannot follow the steps in a workshop	Real-time workshops are hard to replicate online	Prepare detailed instructions for practical tasks; use workshop time for troubleshooting

Structure on LMS	A course has a lot of content	Online courses tend to become a hoarding place for all possible materials	Use LMS for creating a course narrative
Online for theory	Practical lessons are not possible due to the absence of needed equipment at home	Practical lessons are hard to organize online	Change course content to a more theoretical and discussion-based
Invite diverse speakers	Lecturing is not engaging	During an online lecture students keep cameras off and do not participate in conversation	Turn a lecture into a discussion/ conference talk with an external art professional. Thus lecture turns into a networking event

4 Discussion

4.1 Educational objectives in digitally-mediated teaching

The present study revealed a rich landscape of educational objectives art teachers and art education researchers set to achieve for students in digitally mediated settings. The objectives cover multiple educational milestones in becoming an artist: Knowledge, Idea-oriented, Object-oriented, Technological competency, Collaboration, Affective, Personal, and Professional development. Compared with research papers, teacher interviews mentioned multiple educational objectives for the first time. The mentions' proportion significantly differs from previously published literature. Next, the study pointed out an empirical-based model to connect educational objectives with teaching strategies (teaching patterns) that art educators use in digitally mediated lessons. We discovered that all dimensions of design thinking have correlating teaching patterns. In addition to the design thinking model, visual arts education includes dimensions outside the design thinking paradigm (Personal, Professional, Technological competency, Collaboration, and Knowledge acquisition). United, focusing on goals and art teaching patterns might support art educators in planning visual arts lessons and courses.

Some objectives went beyond design thinking, which might suggest that higher visual arts education should employ other theories to conceptualize the teaching process. For example, the ability to critically reflect on one's art was mentioned in multiple interviews, and it is not a part of the design process, according to the creators of the Double Diamond model [59]. Holly [60] supports the importance of reflection in education: “Leaving too little time for reflection leaves the learning process incomplete.” The Personal development objective group made a significant percentage of mentions in both interviews and papers, but it does not fit into the Double Diamond model. Personal development is a crucial target in contemporary art and design education, where the role of educators gradually shifts from teaching to tutoring [61]. Transformative pedagogy principles target a student’s personal development to become a design professional [62]. Art education heavily influences personal development [63], and some pedagogical patterns align with the transformational approach [64]. Experiential problem-based learning is a signature of an art studio [65]. Overall, the group might be classified as a generic learning outcome group [35] because the skills targeted by the groups might be used beyond the artistic professional context.

The Affective group of educational objectives looks similar to the Attitudes group of learning outcomes [33]. Teachers play an emotional support role in a student's relationship, positively affecting the learning process [66]. Interacting with students, teachers influence a positive psychological state (Psychological Capital), which “plays a crucial role in academic outcomes, including academic performance, engagement, burnout, adjustment, stress, and intrinsic motivation” [67].

Learning outcomes types described by Adam [35], “Using technologies” and “Team working skills,” are both represented in the study as separate Objective groups: Technological competence and Collaboration. An art/design studio's problem-based learning model emphasizes teamwork [68]. Tech literacy is one of the most essential skills for artists to keep up with the times [69]. The Knowledge development group is also mentioned in learning outcomes theory as declarative knowledge, and this knowledge type is strongly endorsed in an art studio [70].

The most striking discovery was that shifting to an online teaching delivery mode did not affect educational objectives. Online teachers used different tools to shape learning, changed lesson structure, and modified pedagogical strategies; but their educational intentions remained similar to those in face-to-face mode. Research suggests that the 21st century demands people master these skills to withstand the challenges of the time: critical thinking, problem-solving, collaboration, leadership, agility, adaptability, initiative, entrepreneurship, communication, analysis, curiosity, and imagination [71]. The study result revealed that most of these objectives (except for agility, entrepreneurship, and leadership) were targeted by art educators. Moreover, the emphasized Idea-oriented, Personal, and Professional objective groups encompass all of the desired qualities. Thus, the difference between

literature and interview data might signify educational development; art teachers understand how the world around them is changing and direct their students to be ready for the future.

4.2 Digital tools and their impact on art education

The interviewee educators described digitally mediated lessons, and some of the patterns reflected the technological component of lessons. In adapting to an online environment, teachers used some educational patterns from offline practice and added new patterns to adjust to digital mediation. A single technology, or only digitally mediated learning, is unlikely to reach educational objectives effectively [6]. Teachers' inclination to mix traditional and online environments echoes research suggesting that the blended delivery mode is most suitable for art education development [72, 73]. Some educational patterns were directed at building connections between students to exchange knowledge ("pair programming," "find a friend"). Patterns targeting peer knowledge exchange are believed to be particularly valuable in online learning [74].

Surprisingly, the proportion of the digital patterns used by art teachers in online settings was smaller than traditional patterns. It might indicate a gap between the perceived importance of technology integration and its actual implementation [75]. Technological knowledge has become an inseparable element of art educators' skillbooks, becoming as important as knowledge about art making and pedagogy (or andragogy) [76]. In turn, students as active participants in the educational process will have to constantly improve their technological skills to keep up with study programs.

Digital teaching patterns in visual arts use a standard set of digital tools: LMS, video conferencing, video sharing, blogs, online dashboards, and multi-camera setups. Using digital patterns reminds us of a constant problem-solution cycle; video conferencing makes traditional lecturing unbearable, so teachers introduce gamification techniques and blogging elements. Thus, a traditional element gets either abandoned or transformed. When students cannot troubleshoot in a studio, a teacher creates extensive LMS material, so that any possible problem can be documented and solved by students themselves. Digital teaching patterns flip classroom relationships, giving students more autonomy on the one hand and challenging them to self-regulate on the other hand.

4.3 Art education beyond 2030

Exposing teaching patterns with contemporary technology might be beneficial for the integration of digital components into teaching practice. Introducing digital elements into teaching is challenging, so a detailed description of possible digital

interventions might be helpful for every educator who wants to understand online work better. Especially in visual arts, where both teaching patterns and digital education research have been limited, the present study offers a comprehensive view of education science and the technological side of it.

Research indicates that 21st-century skills (creativity, problem-solving, critical thinking) still need more support and development [77]. Patterns that support these skills were visualized in the second results section and might be used as a baseline for finding more teaching patterns for the development of these skills. The attention to Idea and Personal development-oriented objectives and patterns has a connection with competency development. Competency is defined as a "basic quality of an individual that has a causal relationship to effective and/or best performance based on criteria in work or other situations" [78]. Thus, competencies are multifunctional, transferable, and interdisciplinary [79]. Objectives targeted in the leading groups go beyond artistic skill development, so there might be a connection between strengthening meta-skills according to the paradigm of competency-based learning. Many teachers highlight that the most important skills for their students are the ability, motivation, and curiosity to learn.

Critical understanding of AI is one of the objectives mentioned by one art teacher. This is the direction for future research because AI is considered to become a major transformative force in education in the years to come. It is striking that art educators mentioned AI as a tool to use in work, but did not focus on the necessity of teaching the exact tool. Instead, the critical assessment of AI was considered as a part of the educational program.

Predicting technological use and development in education is complicated [71]. It is mainly hard to do because technology availability and cost are not possible to predict. Virtual and augmented reality is one of the most promising tools for education. Even with the release of several VR helmets, this technology has not become an educational staple as a tablet, computer, or smartphone. AI has better chances of getting included in the classwork because many generative models were released to the open source, so teachers and students could use them for free. No special equipment is required for using these models, except a regular laptop.

This study's findings hold merit, but some limitations require consideration. The analysis relied on manual coding, introducing subjectivity and potential human error. The intercoder agreement was discussed using one interview from the sample. Additionally, the study design has a Western bias. Participants were mainly from Europe and the United States, limiting the generalizability of the results to a broader global audience. Researchers should be cautious about applying these findings beyond the specific regions and educational programs studied. The open-ended interview format for gathering objective data might have been less effective than a structured survey. With interviews, researchers extract objectives from participant responses, potentially introducing bias. A survey could have provided a

more standardized approach to data collection. Another significant limitation is that the research reflects the post-COVID state of teaching. Data collection happened before artificial intelligence sky-rocketed into public use. Therefore, the digital opportunities with AI tools did not appear in the study results.

The presented research aimed to discover and structure educational objectives and teaching patterns in higher visual art education. The results might be helpful for art educators in planning lessons and study programs. This study opens doors for further research on how objectives interact within art education. One intriguing finding is the potential for using some objectives as stepping stones to achieve others. For instance, an instructor highlighted the importance of building a portfolio for professional success, an objective categorized as "Professional" in the study. They viewed project-based learning ("Object-oriented" objective) as a critical way to achieve this goal. Future research should explore refining and adapting these objective patterns to ensure they effectively align with desired educational outcomes.

5 Conclusion

The presented study proposed classifying and uniting educational objectives in digitally mediated higher visual arts education. Setting clear objectives together with choosing the art teaching patterns as practice ideas might be beneficial to teachers in planning lessons and courses so that the course program would cater to the diverse needs of future artists and art market demands. We discovered 60 objectives relevant to educators and 55 teaching patterns they use to achieve the chosen objectives. Most of the teaching process blended analog individual art making and digital sharing reflective parts. Pairing up educational objectives with suitable teaching strategies would benefit educators who are not experienced, and some of the teaching patterns are especially valuable because they feature the specifics of digitally mediated education.

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