

Reconstruction of University Art Education in the Era of Artificial Intelligence and Mixed Reality: A Curriculum Design Framework Based on the ASSURE Model

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ABSTRACT:

Generative artificial intelligence (AI) and mixed reality (MR) technologies are driving the transformation of university art education from traditional skills training and work appreciation to digital creation, immersive experience, and cross-media expression. However, current applications mostly remain at the tool level, lacking a systematic and transferable teaching design framework. Based on the ASSURE instructional design model, this paper integrates the concept of "borderless learning" and extends the LeSMaT (Borderless) framework to the field of art education, proposing "Learning Science and Arts Together in a Borderless World" (LeSAT (Borderless)), and constructs an AI-MR enhanced university art course framework. This framework unfolds around six stages: learner analysis, goal setting, medium selection, teaching implementation, learning participation, and evaluation. Taking university art courses as an example, a four-stage progressive teaching process is designed: interest stimulation, skill training, immediate feedback, and digital creation, and a five-dimensional course goal is constructed, covering physical skills, artistic creation, digital literacy, individual empowerment, and social collaboration. From the perspective of educational psychology, this framework helps to reduce technology anxiety, enhance self-efficacy, increase

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learning persistence, and promote the development of higher-order thinking. As a conceptual study, this paper provides a structured and transferable theoretical path for the reconstruction of university art courses driven by technology. In addition, the flexibility of this framework makes it potentially applicable to special education settings, where learner-centered design and multimodal technology integration can address diverse sensory, motor, and cognitive needs.

Keywords: ASSURE, Art Education, Artificial Intelligence (AI), Mixed Reality (MR), LeSMaT (Borderless), Curriculum Design Framework

1. Introduction

Artificial Intelligence (AI) and Mixed Reality (MR) technologies are driving the transformation of university art education from traditional skill training and work imitation to creative expression, cross-media integration, and immersive experiences (Garcia et al., 2024; Chen et al., 2026). However, existing research mostly focuses on the application of technical tools, lacking a systematic curriculum design framework that integrates technology, learner characteristics, and creativity development (Hu, 2024; Cabellos et al., 2024). Therefore, constructing a university art course framework that integrates instructional design logic, technology integration capabilities, and creativity cultivation orientation has become an important issue in current art education research. The ASSURE model as a classic instructional design framework, with its six-step process that is “Analyze Learners”, “State Objectives”, “Select Methods, Media, and Materials”, “Utilize Media and Materials”, “Require Learner Participation”, “Evaluate and Revise”, provides a structured path for the systematic integration of emerging technologies (Heinich et al., 1999). This logic is highly consistent with the curriculum design requirements of this study.

Based on the concept of "Learning Science and Mathematics Together in a Borderless World" [LeSMaT (Borderless)] (Ng et al., 2013, 2023), this study extends into the field of art education, proposing "Learning Science and Arts Together in a Borderless World" (LeSAT (Borderless)). It takes the ASSURE model as the fundamental teaching design logic and integrates AI-MR technology to construct a universal framework for university art courses. A four-stage progressive teaching path is

developed to explore its theoretical significance in promoting creativity development, learning engagement, self-efficacy, and artistic expression

2. Literature Review

2.1. The Impact of AI on Art Education

Artificial intelligence (AI) technology, particularly generative AI (GAI), is profoundly transforming the art education ecosystem. By generating images, music, motion sequences, or visual sketches based on text prompts, students can overcome traditional skill barriers, gradually shifting art learning from mere technical training to creative planning, aesthetic judgment, and iterative work on their pieces. The impact of generative AI on art education is profoundly dual. Existing research indicates that AI can significantly enhance students' creative performance. Nguyen and Kasahara (2025) integrated image generation tools like Stable Diffusion into STEAM teaching, asking students to create creative images and write reflective diaries based on them. The results showed that this teaching model effectively improved students' creative thinking, artistic expression, aesthetic judgment, and learning motivation (Nguyen & Kasahara, 2025). Similarly, art courses supported by generative AI have been proven to inspire students to express artistic themes through digital tools (Kim & Jung, 2023).

In addition to its facilitative role in creation, artificial intelligence also demonstrates positive psychological value in learning. Zhang (2025) pointed out that generative AI tools can not only enhance students' self-efficacy and confidence in learning, but also alleviate learning anxiety and academic pressure. Alqurni (2026) further found

that AI technology can strengthen college students' sense of autonomy support, autonomous learning motivation and learning behavior, indicating that AI has the potential to promote the development of positive learning psychology in educational contexts. However, without reasonable teaching design and teacher guidance, students may overly rely on AI tools, weakening original thinking and higher-order thinking (Hu, 2024), and their works often remain at the surface level of visual presentation, making it difficult to delve into deeper aesthetic analysis and conceptual exploration (Kim & Jung, 2023).

Therefore, an effective AI integration strategy in the future should emphasize a "human-machine collaboration" creative loop, where AI serves as a tool to assist in creative generation, feedback learning, and promoting reflection, rather than replacing the learner's thinking. Relevant research indicates that during the interaction with artificial intelligence, learners' metacognitive abilities and reflective consciousness can be enhanced (Zhang et al., 2026; Chu et al., 2026). Park (2025) further points out that the application of AI in art education needs to be differentiated based on the learner's stage of development: primary education focuses on exploration and enlightenment, secondary education on critical thinking and interdisciplinary integration, and higher education on complex project management and ethical reflection. This reflects that the effective integration of AI must break away from the traditional framework of single-skill training and move towards a convergent path of interdisciplinary, hierarchical, and personalized support. This educational concept that integrates scientific thinking and artistic expression and breaks down disciplinary and spatial boundaries is precisely the core direction of the current international art education transformation.

2.2 Cross-disciplinary and Borderless Art Learning Supported by Mixed Reality

International art education is undergoing a transformation from a paradigm focused on "skill training" to a comprehensive model oriented towards "interdisciplinary integration and creativity". This transformation is a systemic change deeply embedded in the global governance

framework, technological innovation, and sustainable development goals. Its core is the concept of "borderless learning", which aims to break down disciplinary, spatial, and cultural boundaries and build an open, fluid, and interconnected knowledge ecosystem (Cunningham, 1998; OECD, 2019). The UNESCO's "Education 2030 Framework for Action" positions creativity, critical thinking, and cross-cultural understanding as key competencies for Sustainable Development Goal 4.7, emphasizing the cultivation of "responsible global citizens" (UNESCO, 2016; Stephenson, 2023). The OECD's "Learning Compass 2030" proposes three "transformative competencies", namely creating new value, coordinating contradictions and dilemmas, and taking responsibility, aiming to help learners cope with complex social situations and shape the future. These are highly consistent with the emphasis on original expression, cross-media narrative, and critical reflection in art education (OECD, 2019; Taguma et al., 2023; Karseth, 2024; Yliniv et al., 2024). Meanwhile, the STEAM education framework promotes the integration of art with science, technology, engineering, and mathematics worldwide, advocating the use of art to stimulate innovative thinking and aesthetic judgment (Gebeshuber et al., 2024; Montés et al., 2024; Guan et al., 2024). These international consensus provide a conceptual foundation for the design of university art courses empowered by technology.

MR integrates real space with virtual content, providing an immersive, interactive, and cross-domain learning environment for university art education (Garcia et al., 2024; Chen et al., 2026). In the context of art education that emphasizes experience and practice, MR can transform learning into an embodied and participatory creative process. Students observe, imitate, express, and collaboratively reflect in a context where the real and virtual blend, thereby effectively enhancing their learning engagement and embodied cognitive abilities (Garcia et al., 2024; Chen et al., 2026). In art teaching practices, MR has been widely applied in areas such as virtual exhibitions, interactive sculptures, digital performances, and motion visualization in dance instruction (Roldan et al., 2019; Liu & Zhang, 2022; Zhang, 2024; Treffer et

al., 2024; Wang, 2024; Zhou et al., 2023; He & Kosenko, 2025). For instance, students can enter virtual art galleries or digital museums through MR technology to observe and interact with "living" works from all angles (Liu et al., 2024; Wang, 2024); in dance teaching, motion capture and 3D overlay systems are used to provide immediate feedback, enhancing students' understanding of movements and their ability to express through the body (Tsampounaris et al., 2016; Chan et al., 2011). Additionally, MR supports remote collaborative learning across regions, allowing students from different areas to choreograph together, review each other's work, and engage in cross-cultural movements in a virtual space (Huddy et al., 2023). Meng et al. (2025) pointed out that when MR is integrated into dance teaching, students' acceptance of the technology and the timely transformation of the teacher's role are key factors influencing learning outcomes. Research has found that MR immersive learning can enhance learners' sense of presence and embodied cognitive abilities (Garcia et al., 2024), and the unique features of MR, such as gesture recognition accuracy, spatial anchoring stability, and information presentation methods, can effectively provide learners with a sense of immersion (Trunfio et al., 2022), as well as have been proven in educational contexts to enhance learning engagement and participation (Makransky & Petersen, 2019), thus providing a theoretical basis for the transformation of art learning from "observation-oriented" to "immersive experience" and "creative practice".

Ng et al. (2023) proposed the "Learning Science and Mathematics Together in a Borderless World"[LeSMaT(Borderless)]" concept, emphasizing the promotion of subject integration and cross-border learning cooperation through digital platforms (Ng et al., 2013, 2023). Based on this, this paper further proposes the expanded concept of "Learning Science and Arts Together in a Borderless World" (abbreviated as LeSAT(Borderless)), advocating for the deep integration of science learning and artistic creation in a globally interconnected environment. Learners not only understand scientific principles but also express art through diverse methods (such as: visual design, narrative expression, digital performance

and artistic creation), thereby achieving the coordinated development of knowledge understanding and humanistic literacy.

Although MR shows significant potential in university art education, its effective implementation still relies on the support of a systematic instructional design framework, especially in terms of learning design and evaluation mechanisms, which still need to be further developed (Liu et al., 2025). The ASSURE model, as a systematic instructional design model for technology integration (Kurt, 2015), has been applied in the development of visual art education courses (Omar, 2014; Harun, 2016), performance art education modules (Pan et al., 2025), and music course modules (İrmiş & Uludağ, 2023), laying an important research foundation for the reconfiguration of university art courses supported by AI and MR.

2.3 The Adaptability of the ASSURE Model in University Art Education

With the integration of emerging technologies into art education, educational goals are shifting from traditional skills training to higher-order thinking, cross-media expression, immersive experiences, and collaborative learning. The traditional lecture-based model is no longer sufficient to meet current demands (Meng et al., 2025; Radianti et al., 2020). During this transformation, the key to technological effectiveness lies in whether teachers can transform tools into effective teaching resources through scientific course design (Cabellos et al., 2024). The integration of AI and MR technologies urgently requires a systematic instructional design framework, and the ASSURE model provides a clear path for this purpose.

The ASSURE model, proposed by Heinich et al.(1999), consists of Analyze Learners, State Objectives, Select Methods, Media, and Materials, Utilize Media and Materials, Require Learner Participation, and Evaluate and Revise (Heinich et al., 1999). Its core feature is learner-centeredness, emphasizing teaching objectives, technological resources, and learning activities.

From the perspective of learners' psychological mechanisms, the integration of technology should

simultaneously focus on psychological preparation and successful experiences. The Technology Acceptance Model indicates that reducing the sense of strangeness and anxiety towards technology is a prerequisite for stimulating intrinsic motivation (Venkatesh, 2000); the Self-Efficacy Theory emphasizes that experiencing success firsthand is the core approach to enhancing self-efficacy (Bandura, 1997). Additionally, the Self-Determination Theory further points out that autonomy, competence, and relatedness are the three fundamental psychological needs for maintaining intrinsic motivation (Deci & Ryan, 2000), providing a theoretical basis for the goal design of technology-enhanced art courses.

The alignment of the ASSURE model with AI-MR art education lies precisely in its systematic response to these psychological needs: First, starting with "Analyze Learners", it can reflect the differences among students in terms of technology acceptance, learning intentions, art foundations, and digital literacy, providing data-driven basis for the subsequent module design. Second, the model emphasizes the selection of media and resources "Select Methods, Media, and Materials", which helps art teachers to rationally integrate AI tools and MR technology, sort out digital collaborative resources, and avoid the superficial application of technology. Third, "Require Learner Participation" aligns with the characteristics of art education that emphasize practical demonstration, creation, collaborative projects, and experiential learning (Cui & Fan, 2026; Carney, 2022; Li & Vasilyevna, 2025). Fourth, through continuous "Evaluate and Revise" evaluation and revision, teachers can dynamically adjust the course design based on student feedback

and continuously optimize the implementation process.

Overall, the ASSURE model can effectively prevent the problem of overemphasizing technology and deviating from the essence of education due to technological intervention. It is particularly suitable for art courses that focus on embodied practice and the creative process and require the integration of technological tools. Its application in the design of university art education courses is feasible in reality.

3. The AI-MR University Art Curriculum Transferable Framework Based on the ASSURE Model

Despite continuous advancements in related explorations, the integration of technology in art education still largely remains at the application level of digital tools, lacking systematic course design support. Existing research indicates that the learning outcomes of technology integration are influenced by multiple factors such as instructional design, resource support, and platform collaboration (Ng et al., 2025). When technology is embedded within a structured teaching framework and aligns with learning objectives, learner characteristics, and learning contexts, significant improvements can be seen in learning engagement, satisfaction, and knowledge transfer capabilities. In light of the aforementioned gap, this paper introduces the ASSURE instructional design model (Heinich et al., 1999) to construct an AI-MR enhanced university art course framework. This framework, by integrating key elements such as learner analysis, goal setting, media selection, and learning assessment, provides a structured and transferable design path for the deep integration of AI and MR in art education (as shown in Figure 1).

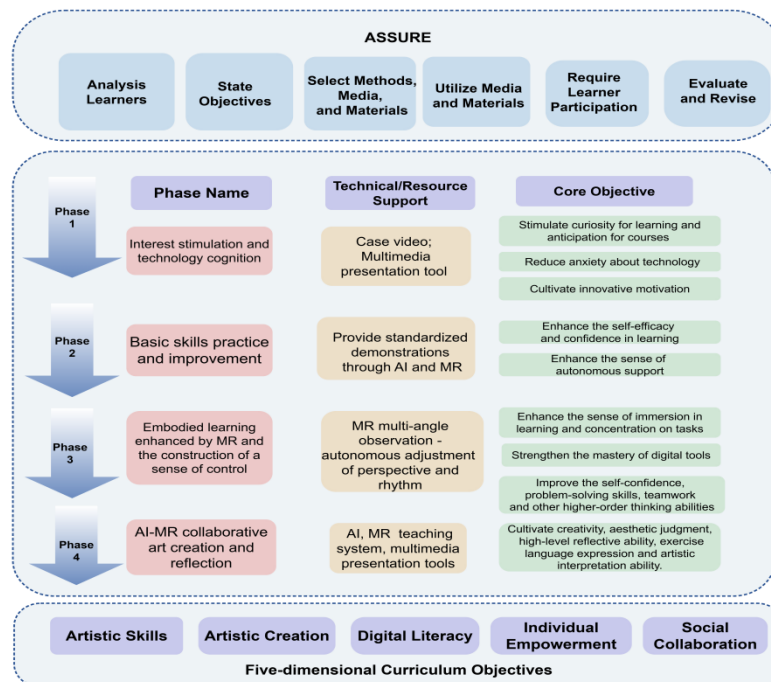


Figure 1: An AI-MR Enhanced University Art Course Design Framework Based on the ASSURE Model

3.1 Analyze Learners

General design principles: Students in university public art courses vary in their professional background, art foundation, and digital experience. Therefore, course designers need to first analyze the learners' needs from aspects such as art foundation, interest preferences, digital literacy, creativity, and technology acceptance, in order to provide differentiated support and meet the diverse learning needs of students. Different types of art courses (visual arts, performing arts, music, etc.) have different degrees of reliance on technology, and need to be evaluated specifically.

Specific operations: Through questionnaires or interviews, pre-identify the differences among students in various dimensions such as their artistic skills (e.g., drawing foundation, dance skills foundation, and proficiency in musical instruments), experience with digital devices, cognition and attitude towards AI tools, and learning preferences. Pay particular attention to the initial levels of technology anxiety and self-efficacy to provide a basis for subsequent differentiated scaffold design (Venkatesh, 2000; Bandura, 1997).

Interdisciplinary examples: In art courses, it is necessary to understand students' familiarity with

digital painting software; in music courses, it is necessary to assess their willingness to accept AI composition tools; in courses emphasizing embodied practice such as dance, it is necessary to examine students' body coordination and their comfort with using MR devices.

In special education settings, more attention should be paid to students' physical conditions, emotional states, technological acceptance, and differences in learning paces, so as to provide timely and differentiated technical and teaching support. For instance, some students may experience discomfort with MR devices or feel anxious due to complex operation procedures. Therefore, teachers should appropriately reduce the technical difficulty, offer more operational guidance and emotional support, and flexibly adjust the learning methods to enhance the inclusiveness and participation in the classroom.

3.2 State Objectives

General design principles: The course objectives should be expanded from traditional skills training to creativity cultivation, advanced thinking development, cross-media expression ability, and collaboration ability, and be combined with the core capabilities of specific art forms to respond to the international trend of art education towards

interdisciplinary and creativity-oriented transformation.

Five-dimensional General Objective Structure:

Artistic Skills: Basic abilities in art, such as painting techniques, dance movements, and instrumental performance.

Artistic Creation: The ability to conceive original works, express across media, and make aesthetic judgments.

Digital Literacy: The ability to generate creative content using AI, create and present works in immersive environments with MR/VR, and defend them.

Individual Empowerment: Learning engagement, self-efficacy, technical confidence, and the willingness to continue learning.

Social Collaboration: The ability to co-create in teams, provide peer feedback, and engage in high-level reflection.

The above teaching objectives can be readjusted in terms of their weights according to the emphasis of different art courses. For instance, art courses can place more emphasis on AI image generation under "Digital Literacy", music courses can focus on ensemble arrangement under "Social Collaboration", and dance courses in professional institutions can lay more stress on technical skills and artistic creation.

3.3 Select Methods, Media, and Materials

General design principles: University art courses should organically integrate traditional art media with new digital technology tools to build multimodal learning environments and interactive teaching scenarios. The selection criteria should include course objectives, learners' technological readiness, equipment availability, and teaching scenarios.

This study recommends media from the following three levels:

The foundational layer: Relying on traditional art media, including the use of canvas and paint as the core carriers in the field of painting, musical instruments as the core carriers in the field of music,

and the body and space as the core carriers in the field of dance, it lays the foundation for the experience of the essence of art.

Technical Layer:

(1) Generative AI platforms, such as DALL·E, Stable Diffusion, Chat GPT, and Cartwheel digital human generation tools, are used for inspiration, draft generation, and structure planning.

(2) MR teaching systems are used for embodied interaction, virtual rehearsal, following and imitating, and real-time feedback.

(3) Multimedia presentation tools, such as projectors, interactive whiteboards, and online galleries, are used for process explanation, peer review, and work display.

(4) Digital portfolio platforms, such as Padlet, Seesaw, and customized electronic archives, are used for process documentation and reflection.

Cross-disciplinary adaptation:

Fine Arts: Utilize AI to generate image sketches, provide color matching and composition suggestions to assist students in creative conception; combine MR and VR technologies for color filling, virtual gallery exhibitions and work displays, enhancing the visual experience and immersive learning.

Music: AI-generated melody fragments provide students with creative inspiration in terms of rhythm and chords, supporting music composition and adaptation; MR technology is used to build a virtual band collaboration environment, enabling immersive rehearsals, simulated performances, and interactive playing for multiple people.

Dance: AI-generated choreography structures and content suggestions offer students creative inspiration; MR motion capture technology is used to create digital human demonstrations, and the MR dance teaching system provides virtual teaching, enabling action demonstrations, real-time corrections, and immersive dance training.

Drama: AI-generated script outlines, character settings, and plot development frameworks assist students in drama creation; MR virtual scene technology is used to build immersive rehearsal

environments, enhancing character experiences and stage interaction performances.

For special education scenarios, the selected technological tools should support accessibility features, such as providing screen reading for visually impaired individuals, adding caption prompts and haptic feedback for those with hearing impairments, and supporting eye-tracking, voice commands, or extended operation time for learners with motor impairments, to meet the operational needs of learners with different types of disabilities.

3.4 Utilize Media and Materials

General design principle: Teachers should view technology as a creative medium rather than merely a presentation tool. In the design of technology, teachers should focus on serving the creative process and learning experience, rehearse the technical process in advance, ensure the stability of equipment, and prepare corresponding alternative plans to guarantee the smooth progress of teaching activities.

Implementation Strategy:

Technology Tool Integration Strategy: In the initial stage, teachers will demonstrate how to use AI to generate creative materials and how to operate technical devices for interaction, and provide step-by-step operation guides, such as video tutorials and illustrated manuals etc; in the middle stage, guide students to screen, adjust and re-create the content generated by AI; in the later stage, encourage students to independently use technology tools to complete work reports and presentations.

Collaborative Use: Encourage students to share one device in groups, with one person operating and multiple people observing and discussing, to alleviate the pressure of insufficient equipment.

Interdisciplinary Examples:

Fine Arts: Students hand-draw sketches on paper, then use AI to generate variations, and finally import the final works into digital tool devices.

Dance: Students learn movements by following MR digital humans, record their practice videos, and compare them with standard movements.

Music: Students utilize AI to generate melodic and

rhythmic inspirations, and then create and adjust through music editing software, and finally complete immersive performance and collaboration experiences with VR virtual instruments.

3.5 Require Learner Participation

General design principles: Learning activities should center on active construction, collaborative exploration, and reflective iteration, integrating technological tools throughout the entire process of creation, interaction, and evaluation to facilitate learners' transformation from knowledge recipients to content creators.

The following activity types can be adjusted according to different course types:

Immersive Experience: Use VR for virtual sketching, digital human dance practice, and MR concert hall ensemble performance.

Collaborative Creation: Use AI to generate learning plans, screen and revise them through group discussions, and divide tasks to complete art works.

Peer Teaching: Students who have mastered skills demonstrate and teach their peers, and can use the VR/MR recording and playback function for error correction.

Public Display and Critique: Use multimedia platforms to explain the creative process and concepts, display the created art works, and have teachers comment and organize peer reviews among students.

Reflection Journal: Require students to record their feelings about technology use, difficulties encountered in learning and solutions, to cultivate students' metacognition.

Motivation Maintenance: Enhance students' self-efficacy through technology-enabled learning experiences; strengthen students' intrinsic motivation through a sense of belonging and identity in group collaboration.

In special education applications, the design of teaching activities can be further specified, such as breaking down teaching tasks into more detailed steps, extending operation time, and providing auxiliary demonstrations, to ensure the effective participation of learners with different abilities.

3.6 Evaluate and Revise

General design principles: The evaluation system should adopt diversified approaches to comprehensively assess the quality of the work, the performance in the creative process, classroom participation, the development of creativity and reflective ability. At the same time, it should pay attention to students' feedback on their experience of using technology, their engagement in learning and their satisfaction with the course. Teachers can iteratively update the course content, teaching strategies and technical configuration based on the results of formative and summative evaluations to enhance the effectiveness of course implementation.

Teaching evaluation can be carried out from multiple dimensions such as the creativity of the work, aesthetic expression, classroom collaboration, technical operation ability, self-efficacy, learning motivation and reflective ability. For example: Process assessment can be conducted through observation rubrics, learning journals, questionnaires, classroom records and digital tool systems. Summative assessment can be formed by combining interviews and course examinations. In the context of special education, assessment should not only focus on learning outcomes but also track the growth trajectories of learners in areas such as self-regulation, sensory integration, and technological adaptation. Appropriate personalized observation and assessment rubrics should be developed for different groups, and dynamic evaluations should be conducted in combination with qualitative feedback.

Teachers can dynamically adjust teaching strategies and technical difficulties based on feedback, and continuously optimize course design. This framework is applicable to different art courses such as fine arts, music, dance and drama, and the evaluation content can be adjusted according to the characteristics of the discipline.

3.7 An Overview of the Four-Stage Progressive Teaching Process

Based on the six steps of the aforementioned ASSURE model, this framework further designs a four-stage progressive teaching process to integrate the implementation of AI and MR technologies in

university art courses. It can be divided into four stages: (1) Interest stimulation and technology cognition; (2) Basic skills practice and improvement; (3) Embodied learning enhanced by MR and the construction of a sense of control; (4) AI-MR collaborative art creation and reflection. The educational psychology analysis in the following Part 4 is centered around these four stages

4. Implications for Educational Psychology

This framework is constructed based on the ASSURE model, and its four-stage progressive implementation structure reflects the psychological development logic of art learning under the empowerment of technology. The LeSAT (Borderless) concept proposed in this paper further emphasizes the integration of scientific logic and artistic expression, aiming to respond to the trend of transformation in higher education art education towards interdisciplinary integration and creativity orientation. The following elaborates on its educational psychological significance from four aspects.

4.1 Reduce Technological Anxiety and Stimulate Learning Motivation

The first stage, "Interest stimulation and technology cognition", aims to reduce students' unfamiliarity with emerging technologies through instructional design. Before students formally engage in technical operations, cases and explanations are used to help them understand the principles and application scenarios of AI and MR. This design aligns with the core perspective of the Technology Acceptance Model: reducing the sense of strangeness and anxiety towards technology is a prerequisite for stimulating intrinsic motivation (Venkatesh, 2000). Existing research indicates that AI tools can help alleviate learning anxiety and enhance autonomous learning motivation (Zhang, 2025; Alqurni, 2026), providing indirect support for the design of this stage.

4.2 Enhance Self-Efficacy and Strengthen the Persistence in Learning

The second phase of this framework focuses on the practice and improvement of basic artistic skills. It provides students with standardized demonstrations,

real-time feedback support, and immersive learning experiences through AI and MR technologies. Unlike the learning anxiety that may be triggered by direct correction from teachers in traditional classrooms, the technology-assisted environment allows students to repeatedly observe, practice, and correct at their own pace, and make self-adjustments without social pressure. Existing research indicates that AI tools can enhance students' self-efficacy and learning confidence (Zhang, 2025), as well as their sense of autonomy (Alqurni, 2026). The design of this phase aims to help students build self-efficacy through continuous successful experiences (Bandura, 1997; Saemi et al., 2012), thereby strengthening their persistence in the face of learning challenges.

4.3 Enhance the Sense of Control Through Learning and Promote the Development of Higher-Order Thinking.

The third stage "Embodied learning enhanced by MR and the construction of a sense of control", through MR technology, students can observe standardized demonstration content from multiple angles, independently adjust their viewing perspectives and learning paces, thereby enhancing their sense of learning control. On this basis, "peer teaching" tasks are set up to promote learners' leap from "learning" to the higher-order thinking level of "teaching others", which is consistent with Park's (2025) emphasis on the "human-machine collaboration" concept. Here, AI and MR are not only tools for skill training but also important media for promoting the development of metacognition and reflection abilities.

4.4 Cultivate Creativity and Aesthetic Experience, and Deepen Intrinsic Motivation

The fourth stage focus on the collaborative application of AI and MR technologies. With the assistance of AI tools, students complete the conception of their artistic creations and present and explain the creative process to their peers through multimedia platforms, thereby achieving a role transformation from "skill executors" to "art creators". Research indicates that integrating AI into art courses can significantly enhance students' creative thinking, artistic expression, and aesthetic judgment (Nguyen & Kasahara, 2025; Kim & Jung,

2023); MR technology further boosts learning interest and sustained participation willingness, and creates a low-pressure space for autonomous practice for students. This stage provides students with a borderless learning environment for artistic creation under scientific assistance. This human-machine collaborative experience offers psychological satisfaction that traditional skill training lacks: autonomy (choosing the creative theme independently), competence (completing creations with AI and teaching others), and relational connection (collaborative display and mutual evaluation), thereby effectively deepening students' intrinsic motivation (Deci & Ryan, 2000).

In summary, this framework, centered around five-dimensional course objectives, through a four-stage progressive teaching process, integrates the promoting effects of AI on self-efficacy, learning motivation, and creativity (Alqurni, 2026; Zhang, 2025; Nguyen & Kasahara, 2025), as well as the enhancing role of MR on embodied cognition and immersive experience (Garcia et al., 2024), forming a coherent psychological development path, aiming at the all-round development of learners' curiosity, self-efficacy, sense of learning control, intrinsic motivation, and aesthetic literacy

5. Conclusion

Based on the ASSURE instructional design model, this study constructed an AI-MR enhanced university art curriculum framework. Taking the university dance course as a case, it systematically expounds the design concept, technical configuration, implementation process and evaluation mechanism of this framework. This framework not only provides an operational and transferable theoretical path for the integration of AI and MR technologies into art education, but also promotes the transformation of the art education paradigm, echoing the interdisciplinary integration concept of "Learning Science and Arts Together in a Borderless World (LeSAT(Borderless))" proposed in this paper. Moreover, it clarifies the progressive psychological development path of this framework from the perspective of psychological education. Furthermore, the transferability of this framework indicates its potential value in special education: technology-enabled teaching can be customized

according to the needs of different learners, thereby supporting learner-centered cognitive development, enhancing learning efficacy and motivation, as well as fostering artistic expression abilities.

It should be noted that this study is a conceptual analysis article, and the proposed framework has not yet been subject to large-scale empirical testing. Future research can verify its effectiveness through experimental or quasi-experimental designs in

different universities and various university art classroom settings, and further optimize the design of art course modules by combining learning process data and student psychological measurement indicators. In addition, as AI, MR technology, and other emerging technologies continue to develop and update rapidly, this framework needs to remain dynamically evolving in teaching practice

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