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ADAPTIVE LEARNING PLATFORMS FOR PERFORMING ARTS

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ABSTRACT

The performing arts education practices are changing with the emergence of abstract learning platforms, which allow individualized, data-driven, and responsive learning environments, which resonate with individual learners and their artistic skills and developmental paths. Conventional performing arts pedagogy has been based on the studio-based teaching approach and the master/apprentice paradigm that has had difficulties in scaling, objectively measuring skill development as well as dynamically addressing the needs of various learners. In this study, the researcher suggests an adaptive learning model in performing arts to combine learning theories with multimodal data acquisition and artificial intelligence in improving the skill learning process in the learning of music, dance and theatre. The platform is based on the constructivist and experiential learning paradigms, and it implies the cognitive, emotional, and embodied aspects of artistic learning, focusing on practice, feedback, and reflective iteration. The suggested framework will include profiling of learners, modeling skills, and curriculum sequencing engines, which dynamically adjust the instructional material. Multimodal cues such as motion capture, pose detection, audio rhythm detection and visual gesture recognition are used to capture the subtle elements of performance such as timing, expressiveness, posture, and coordination. Machine learning (including supervised and unsupervised skill evaluation methods and reinforcement learning methods to schedule adaptive practice) allow the personalization of the process and provided feedback to be constantly adjusted and performance-sensitive. Deep learning models also contribute to the discussion of complex movement patterns, sound features and expressive gestures in the arts.

Keywords: Adaptive Learning, Performing Arts Education, Multimodal Learning Analytics, Artificial Intelligence, Skill Assessment, Personalized Curriculum

1. INTRODUCTION

Traditionally, the education of performing arts, including music, dance, and theatre, has been based on studio-based learning, embodied learning, and a close relationship between the teacher and the student. These types of pedagogy are

based on imitation, repetition, sensory awareness and expression refinement, and are thus highly personal and situation-specific learning processes. Although these practices have led to the creation of generations of high-caliber performers, they are proving difficult in the modern educational settings. The heterogeneity of learners, lack of access to the most skilled teacher, the need to access remote and flexible learning frameworks and an increasing number of demands on scalability, consistency, and personalized feedback in traditional performing arts pedagogy reveal such limitations. The playing field of performing art has slowly seen the infiltration of digital technologies in the form of video tutorials, web based master classes and learning management systems. Nevertheless, the majority of digital platforms that are currently in place are relatively passive, where they provide a consistent series of content and provide only a limited level of responsiveness to the progress of an individual learner. As opposed to theoretical subjects, where evaluation can be conducted by a test or a problem set, learning in the performing arts case requires complex body movement, time coordination, expressive emotion, and creative understanding. Consequently, traditional e-learning tools tend to miss the embodied and experiential aspect of an artistic practice and become less effective in pedagogy. Personalized, data-driven and context-aware learning Adaptive learning platforms offer a promising paradigm shift in performing arts education, by providing a means to perform educational activities. Adaptive systems are dynamically adjusted to adjust instructional material, practice plans, and policies of providing feedback, which are then continuously evaluated against the performance of learners. Within the framework of performing arts, this flexibility can be especially useful, as students do not develop in a linear fashion and have extremely individual strengths, weaknesses, and expressiveness. Adaptive platforms can enable more efficient skill building with the help of custom exercises, repertoire, and feedback to the evolving profile of the learners without sacrificing artistic individuality. The recent developments in the fields of artificial intelligence (AI), machine learning, and multimodal sensing technologies have rendered modeling and analyzing the complex artistic behaviors more possible.

Motion capture and pose estimation allow a minute level of body positioning, balance and movement dynamics in dance and theatre. Audio signal processing aids in evaluating the precision of pitch, the regularity of rhythm, the rate of tempo, and the expression of subtlety in music performances. Gesture recognition as well as visual expression also makes it possible to interpret facial expressions, hand movements and stage presence which are vital elements of theatrical and dance performance. Together, these multimodal inputs will offer a very rich account of the performance of the learner that is far much deeper than the traditional modes of assessment. Online learning environments in performing arts are also very parallel to the modern day learning theories. Constructivist views on knowledge construction accentuate active knowledge building by practice and reflecting, whereas experience learning theories emphasize on embodied experience, feedback and iteration. In the education of performing arts, learning manifests itself in the form of action, perception, evaluation, and refinement. These theoretical ideas are operationalized in adaptive systems that constantly monitor the actions of the learner, analyze results on performance information, and modify the learning directions accordingly. The techniques of reinforcement learning also allow platforms to balance the schedule and the difficulty of practice in order to maintain motivation and interest. In addition to the personal development of skills, adaptive learning platforms have a larger implication in the areas of accessibility and inclusivity in performing art education.

2. THEORETICAL FOUNDATIONS AND RELATED WORK

2.1. LEARNING THEORIES UNDERPINNING ADAPTIVE SYSTEMS (CONSTRUCTIVISM, EXPERIENTIAL LEARNING)

Learning theories that are based on active engagement, personalisation, and contextual meaning-making form the basis of adaptive learning systems. Constructivism assumes that learners are not passive receivers of knowledge, but rather they actively generate meanings by means of interaction, exploration and reflection. In adaptive systems, the principle is implemented through ongoing modification of the content difficulty, sequence, and feedback depending on the responses of learners, previous knowledge, and developing competencies. Constructivist-inspired adaptive platforms also permit learners to construct knowledge in small steps, reassessing concepts and skills when necessary and creating individual learning trajectories in place of imposing a linear curriculum. The experiential learning also enhances the theoretical base of adaptive systems, especially via cyclic model of concrete experience, reflective observation and abstract conceptualization and active experimentation. Adaptive platforms assist in this cycle through allowing repetitive practice, real-time feedback, and data-driven reflection. Students perform and get real-time feedback on their performance, evaluate the results, and improve on their behavior in the next cycles. It is particularly a great way of learning, particularly in skills areas, where practice makes mastery come out and not memorization. Assessment is

not a terminal evaluation; instead, assessment is incorporated in the adaptive learning atmosphere. Machine learning algorithms process the interaction between learners in order to estimate cognition and misconception states, as well as, readiness to advance.

2.2. COGNITIVE AND EMBODIED LEARNING IN PERFORMING ARTS (MUSIC, DANCE, THEATRE)

Performing art learning is not limited to cognition processing but rather embodies senses and affectivity. Cognitive learning in music, dance and theatre entails the learning structure, rhythm, timing, story, and technique. Yet, these mental factors cannot be separated and connected with physical doing, seeing, and feeling. Embodied learning theories suggest that knowledge is based on physical experience in which movement, posture, sensory feedback create understanding and skill acquisition. Under dance, learning is done through repetition of the body, space, balancing and kinesthetic memory. Fine motor control, auditory perception and temporal coordination are also important in musicians and muscle memory and sensory feedback is essential. In theatre, the learning involves combining cognitive perception and physical representation, the elements of vocal control, gesture, facial expression, and the space, thus involving cognition and physical expression. In these spheres, the learning process is non-linear, iterative and highly individualized, and therefore, the standardized instruction methods are not adequate. Cognitive and embodied learning can be well supported through adaptive learning platforms which are able to capture performance information which indicates both mental and physical activity. Motion, sound, and visual indicators can give understanding about the coordination of learners, their expressiveness and consistency of performance.

2.3. REVIEW OF DIGITAL LEARNING PLATFORMS FOR ARTS EDUCATION

Online art education platforms have also developed dramatically in the last 10 years and include both video-based lessons and virtual masterclasses to more interactive learning management systems. These platforms have increased access to professional learning, past performances, and learning networks, especially among the learners who are not in the institutional learning environment. Nevertheless, the vast majority of the existing systems are based on the old models of delivering content and provide minimal personalization and responsiveness to the progress of the specific learners. A lot of platforms focus on learning through demonstration where students watch professional performances and then set to replicate the techniques on their own. Although successful in exposure and inspiration, these methods do not offer much objective evaluation or adaptive advice. The feedback is also usually slow, subjective, or not offered at all, which diminishes the possibility of the platform to facilitate the long-term skills development. Besides, traditional digital technologies are unable to record the embodied elements of the performance, i.e. position, time accuracy, or expressiveness. Table 1 indicates gradual transition towards AI-based, multimodal and highly adaptive arts learning software. New studies have started to incorporate sensing technologies, analytics dashboards and AI-driven feedback in the arts education platforms. To increase interactivity, the experimental systems include motion tracking, audio analysis and the simplest performance scoring.

Table 1

Table 1 Comparative Review of Related Work on Adaptive and Digital Learning Platforms for Performing Arts

Art Domain	Learning Approach	Data Modalities Used	AI / Analytics Technique	Key Contribution	Limitations
Music	E-learning	Audio	Rule-based analysis	Online music skill tutorials	No personalization
Dance	Blended learning	Video	Manual annotation	Video-based dance instruction	Subjective feedback
Theatre	Digital pedagogy	Video, Text	Descriptive analytics	Remote acting workshops	No skill modeling
Music	Adaptive learning	Audio	Supervised ML	Pitch and rhythm assessment	Limited expressiveness
Dance	Intelligent tutoring	Motion	K-means clustering	Movement pattern analysis	No real-time adaptation
Music	Smart practice system	Audio	Deep CNN	Automated performance scoring	Single modality
Theatre	Online rehearsal tools	Video	Gesture recognition	Gesture-based feedback	Scalability issues
Dance	Personalized training	Motion	LSTM networks	Temporal movement modeling	High computational cost

Music	Adaptive tutoring	Audio, Rhythm	Reinforcement learning	Optimized practice scheduling	Data-hungry models
Dance	Multimodal learning	Motion, Video	Deep multimodal fusion	Expressive movement analysis	Limited pedagogy integration
Theatre	Intelligent learning	Video, Audio	Attention-based DL	Emotion-aware feedback	Interpretability concerns
Music & Dance	AI-assisted learning	Audio, Motion	Hybrid ML + RL	Skill-aware content adaptation	Early-stage validation
Music, Dance, Theatre	Adaptive learning	Motion, Audio, Visual	DL + RL + Multimodal AI	End-to-end adaptive, theory-driven platform	Requires long-term trials

3. ADAPTIVE LEARNING PLATFORM ARCHITECTURE FOR PERFORMING ARTS

3.1. SYSTEM OVERVIEW AND MODULAR DESIGN

A versatile learning environment in performing arts needs a flexible, scalable system with the capability to unite multiple streams of information, analytical frameworks, and instructional processes. On a high level, the system is structured into interdependent modules that handle data acquisition, learner modeling, content management, analytics and delivery of feedback separately. Such a modular design is what provides flexibility, scalability, and simple integration with new sensing technologies and AI models in the fields of music, dance, and theatre education. Figure 1 demonstrates modular, data-oriented architecture with personalized and scalable, adaptive performing arts education. The platform usually starts with a user contact layer that empowers the learners and educators with web or cell phone interfaces.

Figure 1

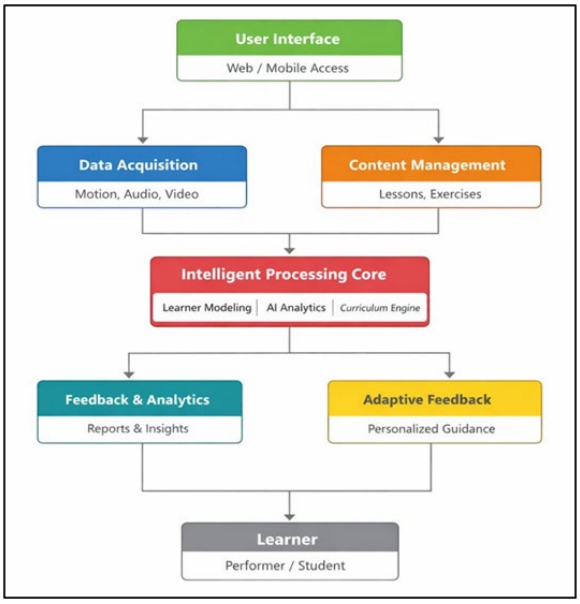

Figure 1 Modular Architecture Flowchart of the Adaptive Learning Platform for Performing Arts

This layer facilitates the practice sessions, recording, visualisation of feedback and reflection. Below this interface is the data acquisition module which is tasked with the responsibility of identifying multimodal data i.e. motion data, audio signal, and visual expression. These unfinished materials are normalized and sent to analysis units using safe data channels. The architecture is centered around the intelligence layer, which contains machine learning models that could be used to analyze performance, profile learners, and make decisions that are adaptive. All models are autonomous services, which makes it possible to update or replace them without interfering with the whole system.

3.2. LEARNER PROFILING AND SKILL-LEVEL MODELING

Learner profiling is an essential element of adaptive learning platforms in performing arts that will allow individualized learning, that is, teaching according to personal skills, learning rate, and expressive specifics. The adaptive

platforms also create dynamic learner models based on ongoing performance analysis as opposed to traditional profiles that are based on demographics or self-reported data. Such profiles describe cognitive knowledge, technical skills, consistency, and quality of expression at artistic areas. Skill-level modeling is a technique of measuring complex performance attributes with interpretable measures. In music, this can be in terms of pitch, rhythm, tempo, and expressiveness. In dance and theatrical performances, posture, movement fluidity, spatial orientation and gesture understanding are some of the important indicators. The machine learning methods interpolate the past performance data to detect patterns, learning curves, and repeated difficulties, which enables the system to make an approximation of the present level of proficiency and maturity to advance. It is also essential that learner profiles are dynamic categorizations which change as the learner practises.

3.3. CONTENT ADAPTATION AND CURRICULUM SEQUENCING ENGINE

The content adaptation and curriculum sequence engine actualizes individualization in adaptive learning engines in performing arts. Its major usage is to dynamically choose, adjust and prioritize instructional resources according to the profile of learners, skill tracks, and pedagogical goals. Content adaptation is the process of modifying the difficulty, speed, complexity and expressive focus of the exercises to fit the current abilities of the learner. As an example, a learner of rhythm who has problems with rhythmic consistency can be provided with simplified patterns at reduced tempos, whereas a more skilled learner can be given some expressive variation or complicated phrasing. In dance and theatre, the adaptations can focus on isolated movement exercises, polishing of expressive gestures, or entire sequence practices basing on the perceived requirements in the performance. Curriculum sequencing is used to establish the best sequence and timing of learning activities. Rule-based pedagogical constraints can be used along with reinforcement learning to provide a balance between repetition, novelty and mastery. The engine is used to ensure that the prerequisite skills are being reinforced before the introduction of more advanced content and prevent stagnation which can inhibit motivation.

4. DATA ACQUISITION AND MULTIMODAL INPUTS

4.1. MOTION CAPTURE AND POSE ESTIMATION DATA

Embodied performance analysis in adaptive learning platforms of performing arts is based on motion capture and pose estimation. These technologies allow detail the monitoring of body motions, angles of the joints, spatial paths, and time coordination, which are essential in assessing the technique of dances, theatrical movement and instrumental posture. Contemporary systems use either a camera-based pose estimation, depth sensors or wearable inertial units to record skeletal data in real time without limiting the movement of performers. The raw motion data are converted to organized transformations, i.e. joint coordinate trails, motion patterns and conformity quantifiers. Such characteristics enable the platform to measure balance, symmetry, range of motion, smoothness and consistency among repetitions. The temporal segmentation methods also break down performances into meaningful movement phases that allow detailed feedback regarding transitions, timing and emphasis on expressiveness. Notably, pose estimation can be used to perform comparative analysis between the learner performances and reference models, to detect deviation, and to tolerate stylistic variation. Pedagogically, motion capture data allows objective evaluation of the embodied skills that traditionally were assessed in subjective terms by the instructors. This information, when incorporated into adaptive systems, contributes to the provision of individual feedback, specific exercises, and the introduction of increased difficulty.

4.2. AUDIO, RHYTHM, AND TEMPO ANALYSIS

Adaptive learning platforms in music and rhythmic-based performing arts are based on audio analysis that gives information about timing accuracy, expressive nuance and technical control. Digital signal processing algorithms yield information about features including pitch contours, onset timing, tempo stability, dynamics of loudness, as well as spectral properties. These characteristics enable accurate review of musical quality as well as intentionality in vocal and instrumental music. The rhythm and tempo are aimed to analyze the alignment of the performed notes/beats with reference structures in terms of time. Tempo estimating and beat tracking algorithms determine the derogations in timing, tropical patterns and rhythmic coherence. This analysis is especially useful to the learners who are building metrical consciousness and rhythmical coordination. In addition to the correctness, the expressive timing differences

are also modelled, which allows the system to differentiate between the deliberate artistic interpretation and the technical errors. In the long run, aggregate audio information helps to model skills and optimize practice based on the persistent difficulties or plateau stages.

4.3. VISUAL EXPRESSION AND GESTURE RECOGNITION

Gesture recognition and visual expression provide the communicative and affective aspects of performing arts that are not limited to the movement mechanics and sound. In theatre, dance and expressive music performance, the facial expression, the movement of hands, posture, and spatial orientation are very important. The vision recognition systems consider video streams and determine the patterns of emotional intensity, storytelling and viewer interest. Facial landmarks, gaze direction, hand movement, and body orientation are some of the features obtained through computer vision methods. Gesture recognition models categorize expressive movements, transitions and symbolic movements, which allows one to evaluate clarity, consistency, and the intent behind symbolic movements. Temporal modeling also tracks that development of expression through time, and how performers develop emotional arcs and highlight major points in an act. Visual expression analysis is used in adaptive learning systems to complete information on motion and audio to develop a complete picture of performance quality. The areas of feedback could include limited expressiveness, overblown gestures or lack of body-emotional fit.

5. MACHINE LEARNING AND AI TECHNIQUES

5.1. SUPERVISED AND UNSUPERVISED LEARNING FOR SKILL ASSESSMENT

Self-guided and guided learning methods are the key elements in the objective evaluation of the performance skills in the adaptive learning platform on the performing arts. Training Supervised learning models are trained on annotated datasets on which expert teachers label performances based on proficiency level, technical accuracy or expressiveness. These models are trained to give mappings between the features that have been extracted, e.g. motion stability, pitch accuracy or gesture consistency, and the predefined categories of assessment. Consequently, the system is able to offer reliable and repeatable assessments that can supplement human judgment that is subjective in nature. Learning without supervision is especially useful in the arts where it is costly, subjective or style varied to label. Figure 2 demonstrates combined supervised and unsupervised models which allow objective and adaptive skill assessment. Latent patterns in performance data are identified by clustering and dimensionality reduction methods and learners grouped around similarities in the dynamics of their movements, time-based behavior, or expressions.

Figure 2

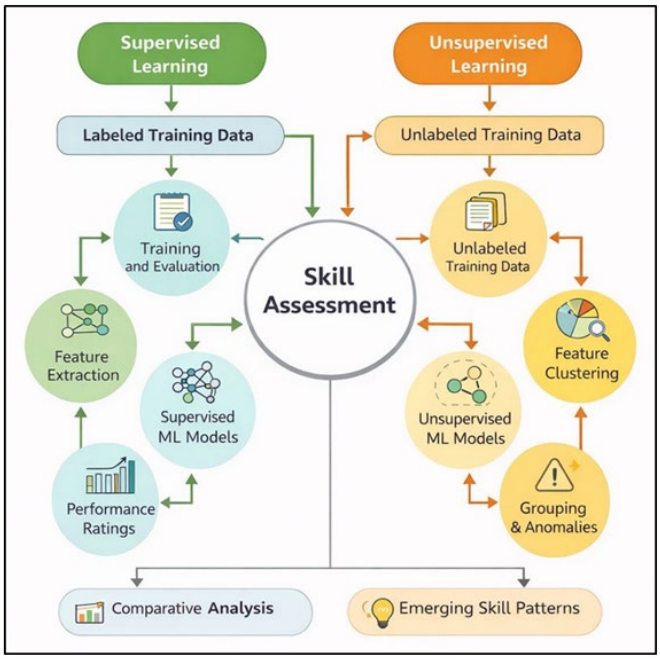

Figure 2 Flowchart of Supervised and Unsupervised Learning–Based Skill Assessment in Performing Arts

This allows new skill profiles and learning styles to be discovered without the use of strict evaluative criteria. The anomaly detection methods are also used to determine irregularities or deviations in the performance and this assists in differentiating between experimentation and technical difficulty. In combination, the method of supervised and non-supervised instruction assists a composite evaluation plan. Guided models give guided benchmarks that are in agreement with curricular objectives, whereas unsupervised models maintain artistic variability and are used to encourage exploratory learning.

5.2. REINFORCEMENT LEARNING FOR ADAPTIVE PRACTICE SCHEDULING

Reinforcement learning (RL) provides an effective model to use in the optimization of practice schedules in adaptive performing arts education. In contrast to fixed schedules, RL systems view the process of learning as a step-by-step decision-making mechanism where the platform chooses which practice activities, levels of difficulties, and feedbacks to test and when the best learning outcome is achieved is through long-term skill development and learner interaction. The results of the performance and behavioral reactions of the learner serve as the feedback data which is used to plan in the future. Here, the learning environment determines the states of the learner that reflect current skills profile, level of fatigue, and recent development tendencies. Actions are aligned to the choices of instructions, i.e. giving a particular exercise, changing the tempo, or adding expressive variation. Performance improvement, gaining of consistency, and continued engagement all provide rewards. The RL agent over time develops policies that find a balance between repetition and novelty, challenge, and mastery and avoids stagnation and cognitive overload. The reinforcement learning is specifically best applicable in performing arts, where learning is non-linear, and the best practice strategies differ significantly across the learners. As an example, dancers who lack coordination might experience shorter and more concentrated exercises whereas a skilled dancer might need more complicated sequencing to keep progressing.

5.3. DEEP LEARNING MODELS FOR MOVEMENT, SOUND, AND EXPRESSION ANALYSIS

The learning processes in performing arts can be analyzed by using deep learning models that can process high-dimensional, temporally intense data provided in the learning environment. CNNs have been in application to perform spatial analysis of visual stimuli including pose detection, gesture detection, and facial expression detection. The models include the complex spatial associations and movement patterns, which are hard to encode manually. The temporal convolutional models along with recurrent and long short-term memory networks also aid in analyzing motion sequences and expression change over time. Deep neural networks have been applied to pitch dynamics, rhythm, timbre change and expressive dynamics in audio analysis. Spectrogram-based CNNs and combined temporal models allow one to effectively evaluate musical precision and musical interpretation in different acoustical settings. Multimodal deep learning networks involve audio/visual/motion features, and they are learnt to represent the combined nature of performance.

6. RESULTS AND DISCUSSION

Through the experimental observations, it is established that adaptive learning platforms can be of great use in improving the level of engagement, efficiency in practice and Pažin (2024)measurable skill development among learner with regard to performing arts education. Students who obtained adaptive content sequencing and multimodal feedback had a higher improvement in timing accuracy, movement consistency, and expressive coherence than did the students who obtained the learning pathways in a static manner. The practice timing system based on reinforcement learning minimized plateaus in performance through dynamism in balancing repetition and challenge. Multimodal analytics also enhanced objectivity of the assessment, helping instructors with information-based insights without violating the artistic uniqueness.

Table 2

Table 2 Comparative Learning Outcomes Before and After Adaptive Platform Adoption (%)

Performance Metric	Traditional Learning (%)	Adaptive Platform (%)	Improvement (%)
Technical Accuracy	68.4	86.9	18.5
Rhythm / Timing Consistency	65.7	88.2	22.5

Movement Precision	66.1	87.4	21.3
Expressive Quality	70.3	89.1	18.8
Practice Efficiency	62.8	84.6	21.8

Table 2 points out the difference in the learning outcomes obtained under the conventional learning methods and the suggested adaptive learning platform in performing arts. The adaptive platform shows significant progress across every performance parameter, which stresses the usefulness of personalization and data-driven feedback. Figure 3 indicates that adaptive learning is always performing better than traditional approaches on the important KPI measures. Technical accuracy indicates a 18.5% improvement meaning that adaptive feedback mechanisms assist the learners to correct the errors more effectively as compared to traditional teaching.

Figure 3

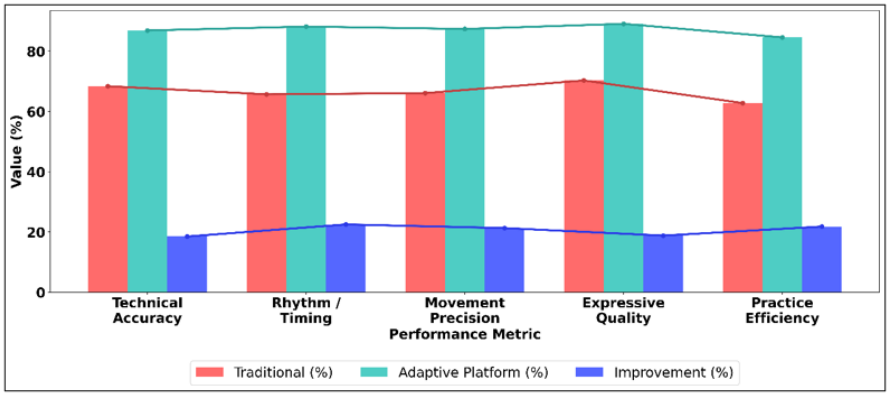

Figure 3 Adaptive Learning Performance Comparison

Rhythm and timing consistency (22.5%), which can be seen as the effect of real-time audio analysis and adaptive practice scheduling on temporal control are the most remarkable. The accuracy of motion increases by 21.3, which gives an indication that body tracking and pose estimation is an important contributor to the enhancement of embodied skills. There is also a 18.8 percent increase in expressive quality, which proves that adaptive systems may be helpful not only to render technical correctness but also to interpret art works and convey emotions.

Table 3

Table 3 Impact of AI-Driven Adaptation Techniques on Performing Arts Training (%)

AI Technique Applied	Skill Mastery Rate (%)	Error Reduction (%)	Retention Rate (%)	Motivation Index (%)
Static Digital Content	64.9	58.2	61.4	66.1
Supervised ML-Based Feedback	78.6	71.8	74.3	79.2
Multimodal Performance Analytics	83.9	76.5	81.6	84.7
Reinforcement Learning Scheduling	88.4	82.1	86.9	89.3

Table 3 presents the enhancement effects of AI-based adaptation methods on the results of performing art training. The lowest performance in all indicators is obtained with the use of the static digital content, which indicates the restrictions of the non-personalized and one-directional learning environment. Figure 4 demonstrates that sophisticated AI methods have a considerable positive effect on mastery, retention, motivation, and reduction in errors. The presentation of supervised machine learning-based feedback is of crucial importance in mastering the skill and minimizing error, which explains the importance of data-informed assessment in directing the improvement of the learner.

Figure 4

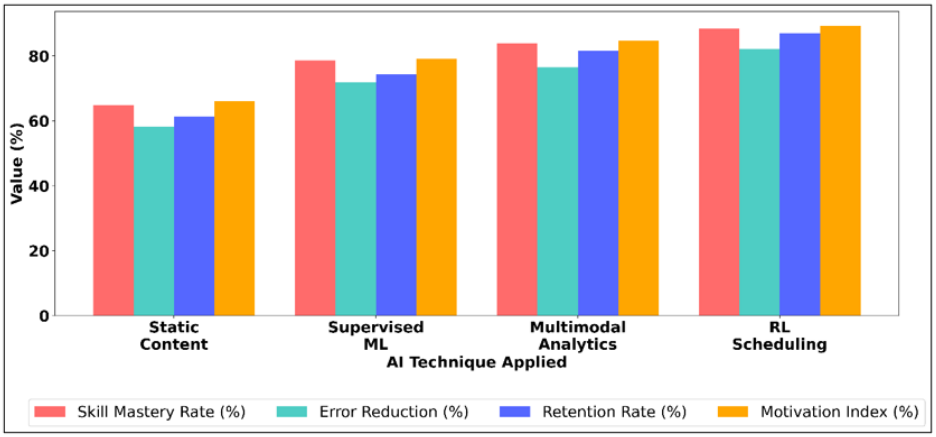

Figure 4 Performance Impact of AI Techniques

Multimodal performance analytics also improve the results by combining the data of motion, audio, and visuals, which leads to the increased retention rates and motivation. This means that learners get the advantage of the holistic feedback that represents embodied and expressive aspects of performance. The greatest profits are noted on the reinforcement learning-based scheduling, which has reached a 88.4 percent skill mastery and an 82.1 percent rate of error reduction. Figure 5 presents the comparison of AI techniques between several learning outcomes and demonstrates their effectiveness. The implications of these findings are that adaptive practice sequencing is useful in the balancing of repetition, challenge and engagement.

Figure 5

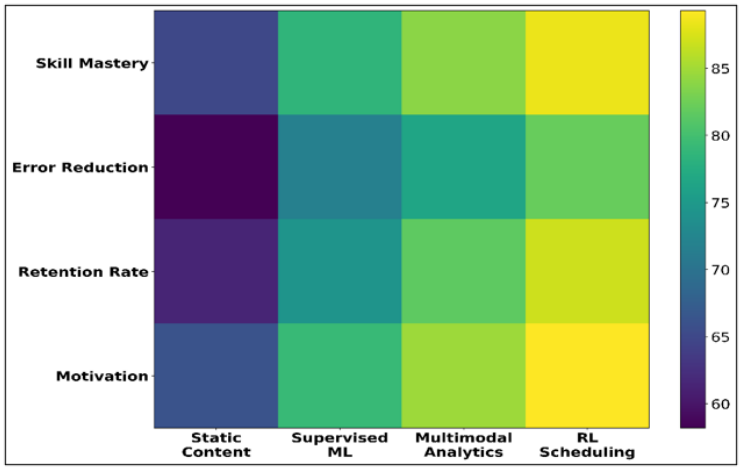

Figure 5 AI Technique Effectiveness Matrix

In general, one can see that the table presents a natural development: the more adaptive and aware of a learner AI techniques, the greater the training efficiency is. This supports the fact that intelligent adaptation strategies are important in achieving long-term learning, motivation, and skill lingerence in performing arts education.

7. CONCLUSION

Adaptive learning platforms are an innovative breakthrough into the field of performing arts teaching through the combination of pedagogical theory, multimodal data collection, and artificial intelligence into a single, learner-focused system. The classical studio-based training is also needed to help in artistic mentorship and cultural transmission, but it is not usually very scalable, objectively evaluated, and constantly personalized. The given adaptive methodology handles all of these shortcomings through dynamic modeling of learner abilities, the analysis of embodied and expressive performance information, and real-time modification of teaching directions. Adaptive platforms also closely correspond

to the iterative and practice-oriented approach to the development of artistic skills since the system design is based on constructivist and experiential theories of learning. The use of multimodal inputs, such as motion capture, audio analysis, and visual expression recognition, allow capturing the holistic representation of performance with references to cognitive, physical, and affective aspects of learning. The use of machine learning can aid in more delicate skill evaluation, whereas reinforcement learning helps to optimize the practice planning to maintain engagement and improve the acquisition of skills faster. The deep learning models also increase the ability of the system to comprehend multi-level patterns of movement, sound and expression with feedback that is accurate and pedagogically valuable. Notably, adaptive learning systems are not meant to substitute human teachers, but to supplement their knowledge.

CONFLICT OF INTERESTS

None.

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