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Strategies of Sight-Reading Ability Improvement: A Review of Literature

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Abstract

Sight-reading is the musical skill of playing a new piece of music at first sight without any rehearsal or preparation. sight-reading is a requirement for formal music achievement or instrument performance level assessments in many countries, Among all musical talents, sight-reading is considered one of the most fundamental performance skills that all musicians should master . The review of literature on the possibility of Sight-Reading improvement highlights the importance of developing effective strategies to enhance musicians' ability to read and perform music without prior rehearsal. Through the literature comparison method, summary induction method, sight-reading in music education, factors affecting piano sight-reading and strategies for improving sight-reading ability three angles to improve the visual reading ability related review,Music educators attach great importance to the cultivation of sight-reading, various studies have investigated different methods and approaches, including eye-hand span practice techniques, cognitive processes, and feedback mechanisms, to determine the most effective ways to improve sight-reading skills. The results show that the use of rhythm, accompaniment, pitch, sight-singing, some learning theory strategies, through mental rehearsal and feedback can help to improve the reading effect. However, more research is needed to explore the long-term effects and individual differences in visual reading ability.For future research, it is necessary to focus on children's sight-reading ability, which is the key period of ability improvement, but also the golden period of sight-reading accumulation. In addition, further research is necessary to study the effectiveness of different promotion strategies, and it is necessary to adopt empirical research means to effectively integrate the promotion strategies into specific training.In the design of training materials, make full use of the selected strategies and methods to achieve real and effective.

Keywords: Sight-Reading, Improvement, Practice Techniques, Cognitive Processes, Feedback Mechanisms.

Introduction

Sight-reading is the musical skill of playing a new piece of music at first sight without any rehearsal or preparation. According to the definition in the Oxford Music Dictionary, sight-reading refers to "the ability to read or sing a piece of music at first sight, in order to perform

it" (Russell, 2016). Le (2017), suggests that when innate musical auditory and spatial intelligence are used to learn a new piano piece, it involves decoding musical symbols and rhythm coordination. This decoding practice is sight-reading, which can be considered a problem-solving process. This skill is extremely important in musical activities, whether for instrumentalists, singers, choir members, music educators, or instrument learners, who all desire to acquire or possess this skill and aim to continuously improve their sight-singing skills. The level of sight-reading ability greatly affects the potential development of piano learners. For students, in particular, good sight-reading skills allow them to spend more time learning the interpretation of music rather than learning the notes (Pierce, Hendtlass, Bartel, & Woodward, 2021).

Mocdonand (1989), proposed the concept of functional piano skills, which are "specific skills, abilities, or qualities required for pianists to function effectively on the keyboard." These functional skills usually include sight-reading, harmony, transposition, improvisation, accompaniment, technique, aural skills, and score reading. In a study by Christensen (2000), participants mentioned the frequent use of accompaniment reading, score reading, coordination, technique, transposition, and sight-reading in functional piano skills teaching. Therefore, "piano sight-reading" is one of the most basic and crucial skills in piano performance, playing a pivotal role in piano learning.

Currently, sight-reading is a requirement for formal music achievement or instrument performance level assessments in many countries, with specific skill level tests set for performance or singing exams (Ji, 2017; Australian Music Examinations Board, 2018a; The Associated Board of the Royal Schools of Music, 2015). In China, instrumental performance grade exams have also begun to include sight-reading level assessments, requiring candidates to take a sight-reading test at the seventh grade (Central Conservatory of Music Grading Committee, 1992). Although this test has not yet been implemented nationwide, it already indicates that in the field of music, sight-reading should be an essential skill for engaging in musical activities.In order to improve pupils' ability in sight-reading, this literature review focuses on exploring effective sight-reading Strategies.

Sight-Reading in Music Education

In the process of music education, educators have long emphasized the importance of sight-reading and accompaniment (Lyke, 1969), and have consistently placed a high value on sight-reading skills (Crider, 1989; Elliot, 1983; Gordon, 1958; Heydenberg, 1960; Jenkins, 1983; Reid, 1995; Solomon, 1984; Williard, 1980; Wright, 1984). The ability to read music effectively is often a primary theme in music instruction (Penttinen & Huovinen, 2011). A core objective of music education is to cultivate excellent sight-reading abilities in students (Grutzmacher, 1987), as teachers recognize that sight-reading is one of the key skills for developing musicians (Gaylen, 2005) and is an essential part of comprehensive instrumental education (Gaylen, 2005, p. 67). Sight-reading is a highly regarded skill in music education, frequently showcased during interviews, new repertoire rehearsals, and musical talent evaluations. Despite its necessity in many situations, there are significant differences in sight-reading abilities among musicians, presenting an ongoing challenge for educators (Farley, 2014).

Sight-reading skills can improve musicians' efficiency and skill in playing unlearned music. In educational settings, students learn music from sheet music, and the ability to sight-read enables them to accurately process and perform music, allowing them to progress to the next level and master expression. Sight-reading is also an effective authentic assessment tool in music education, used to analyze and document students' musical literacy and understanding (Udtaisuk, 2005).

Lyke compiled a rating scale of 20 important keyboard music skills and conducted a nationwide survey of general music teachers and class piano teachers. Lyke's study aimed to determine which items should be prioritized in class piano teaching. Both groups of teachers ranked sight-reading as the first or second most important skill, with general music teachers placing sight-reading and accompaniment second and third, respectively, considering them the most important skills. In a study on piano teaching preferences, both general music teachers and class piano teachers identified sight-reading as the most or second most important skill.

Many music educators have also reported that sight-reading skills are particularly important for young music learners (Chavers, 2010; Olson, 2011; Saxon, 2009; Strouse, 2007; Wilson, 2003). In instrumental education, students' sight-reading is considered fundamental and a prerequisite for completing other skills. The goal of education is to cultivate learners who can learn independently, regardless of the discipline. In music learning, performance skills are important but not as crucial as sight-reading skills because sight-reading is key to enabling instrumental learners to study independently. Overemphasizing performance skills can inhibit the development of sight-reading skills, which is detrimental to independent cognition and thinking (Gregory, 1972). Galyen (2005) similarly believes that music educators should not overemphasize performance skills at the expense of sight-reading skills in teaching. Both sight-reading and performance skills need to be taught separately at the earliest stages of learning an instrument. Beginners and intermediate students should receive regular sight-reading training, which is a beneficial and necessary complement to performance skills. Music educators often face the challenge of choosing the most effective methods to cultivate students' musical literacy skills. The goals of music education are diverse, ranging from developing a deep appreciation of music to developing various technical abilities, including sight-reading, which requires meticulous teaching methods (Udtaisuk, 2005). At the same time, music educators need to maintain an appropriate balance between sight-reading and the process of preparing pieces in music education. Karpinski (2000) suggests that both sight-reading and piece preparation should be emphasized in practice, recommending a reduction in the number of pieces to achieve this balance. This is because the practice of pieces should ultimately serve the experience of improvisational sight-reading.

Arthur (2017), found that excellent sight-reading ability is related to working memory capacity and long periods of deliberate practice. Good sight-readers in music also exhibit enhanced sensory processing abilities in non-music fields, such as auditory frequency and modulation discrimination, visual and perceptual span, visual working memory, word reading speed, and unique cognitive processing abilities in the presence of audiovisual interference. This provides new insights for music education and the use of music to improve other visual processing deficits.

In summary, the goal of music educators is to enable students to become proficient musicians who can not only read and interpret music but also express themselves creatively and authentically through musical activities. Therefore, teachers need to carefully consider the goals of music education and the needs of students, trying numerous methods and teaching techniques to cultivate a rich and beneficial learning experience (Udtaisuk, 2005). Music educators should value students' sight-reading ability during the performance process, continually summarize experiences, analyze the influencing factors of sight-reading ability, and try effective ways to improve students' sight-reading skills.

Factors Affecting Piano Sight-Reading

Many studies have been conducted to investigate factors related to visual reading ability, especially those with predictive capabilities (Daniels, 1986; Demorest & May, 1995; Elliott, 1982; Gromko, 2004).

Eye Movement and Eye-Hand Span

Many researchers have found that the more notes the eyes stay on in the score, the shorter the fixation time during sight-reading, leading to better sight-reading ability. Eye movement and eye-hand span are some factors that influence sight-reading ability. Eye movement, defined as gazing or moving to see clearly, is referred to as "saccade" by Rayner (1998). Spectral reading, like all eye movements, includes a series of fixations and saccadic movements. The duration of fixation and the length of saccade vary depending on different visual tasks (Neisser, 1976; Rayner, 2009). The average duration of musicians' fixation when reading music scores is about 200 to 400 milliseconds (Madell & Hébert, 2008).

Weaver's (1943), pioneering work on eye movement led him to conclude that the trajectory of eye movement during sight-reading is not linear but involves rapid jumps between continuous pauses. Decoding the score with specific eye movement patterns often leads to better sight-reading skills, especially for piano players who not only need to look at the score but also at their hands, placing them on the correct keys, requiring rapid eye movement to avoid deviations and errors (Wristen, 2005). Penttinen & Huovinen (2011) explored the development of sight-reading skills through eye-tracking technology and found that some beginners do not rely on note comparisons for large melodic leaps but directly recognize related symbols. Some beginners read in a linear fashion during sight-reading, while more experienced music readers exhibit more retrospective behavior (Penttinen, 2013), scanning ahead for more details in the score while also using retrospective eye movements to supplement previously scanned details (Goolsby, 1997), exhibiting more fixation with shorter initial fixation time (Waters and Underwood, 1998; Smith, 1989). Proficient sight-reading professional pianists were found to process both the bass and treble clefs simultaneously, using a zigzag pattern of progressive and regressive eye movements and fixations, allowing for simultaneous processing of melody and harmony (Furneaux & Land, 1999; Wristen, 2005).

Lim et al (2019), found that excellent sight-readers are those who excel at adjusting their eye-hand span rather than always maintaining a large span. Thus, studying eye movements and eye-hand coordination can provide a more comprehensive understanding of beginners' eye movements, better understanding the difficulties they encounter when reading annotated music, and offering suggestions for teaching music reading practices (Galyen, 2005).

Information Processing and Pattern Recognition

Many researchers prefer analyzing visual reading from the perspective of cognitive psychology, considering it equivalent to editing a transcription task (Sloboda, 1982). Transcription is not a single skill; it involves a series of continuous actions such as sight-reading, translating, and motor execution (Shaffer, 1978). Reading music, a complex skill, is intricate due to its diverse cognitive processes, such as reading comprehension, audiovisual abilities, spatial judgment, and visual pattern perception. The recognized and processed objects are not single notes (Gromko, 2004). Various musical activities almost involve every neural subsystem of the brain. Cognitive psychology can fully reveal the thinking processes in performance , and cognition's core can be understood as "information processing" (Wilson & Keil, 2001), also called information processing. In sight-reading, this involves integrating, grouping, and classifying the visual information of notes, symbols, and rhythms from the score. Strong sight-readers can process information over a larger span during initial gazes or scans, capturing more details within this limited range. They can chunk the seen information, unlike weaker sight-readers who can only see a small portion and lack data for processing. The chunks are usually encoded note groups or note block vocabularies, possibly previously encountered or common types (Goolsby, 1994). This sense of familiarity results from the memory system's role (Simon and Barenfeld, 1969). In the cognitive range, information chunks can transfer from short-term to long-term memory at a rate of approximately one chunk every 5 seconds. Reencountering sight-reading allows extraction, marking a cognitive accumulation process. Perceiving information chunks also explains why better sight-readers have more fixations while scanning scores, as they process information and simultaneously use progressive and regressive eye movements (Furneaux & Land, 1999). Therefore, processing information chunks is also considered pattern recognition. Wolf (1976) interviewed four highly skilled pianists in sight-reading, who generally viewed music visual reading as a pattern recognition task. The recognized patterns are familiar and related to experience; sight-reading requires recognizing familiar musical structures in the score and identifying whether they form recognizable patterns.

Bean (1938), also believes that visual reading is essentially pattern recognition. During sight-reading, if one can grasp and recognize three or more notes in one glance, such sight-reading will be beneficial for speed and accuracy. This is why proficient sight-readers have stronger pattern recognition abilities, as they can better combine "chunks" of information into more easily recognizable cognitive structures (Waters, Townsend, and Underwood, 1998). As a person engages in regular visual practice, their understanding of underlying structures and patterns gradually deepens (Wolf, 1976). The development of this pattern recognition skill is a hallmark of a maturing visual reader. Kuo (2012), emphasizes that the first step in recognizing patterns is to understand their style, structure, and form. The second step is to identify typical musical patterns, such as motifs, sequences, phrases, rhythms, repeated figures, and intervals in both horizontal and vertical combinations. Thirdly, collect all the different musical patterns encountered and store them in long-term memory. Waters, Underwood & Findlay (1997) found that music sight-reading involves multiple processing abilities, including pattern recognition and the rapid processing of common musical structures. The research confirmed that the pattern-matching paradigm is an effective tool for analyzing music reading skills. The results support the hypothesis that expert music readers can quickly recognize notes or note combinations in the score.

Strategies for Improving Sight-Reading Ability

In a dynamic model proposed by Kopiez (2006), the differences in sight-reading achievement among individuals are more comprehensively explained, including factors such as expertise, information processing speed, and psychomotor speed. The research found that, in addition to accumulated expertise, strategy selection is also an important factor influencing sight-reading achievement. For beginner instrumentalists aged 7-9, practice time only explained 6-11% of the differences, while strategy selection could explain 11% to 42% of the differences.

Fei (2021), adopts a music structure and music character-centered approach, delving into aspects such as harmony, melody, rhythm, genre, texture, and speed. Practical cases are employed to illustrate how visual information about music structure can be effectively harnessed to refine musical character. Song Dan (2018), exemplify efforts to bridge these gaps by focusing on music structure, character, and innovative teaching strategies. These findings offer valuable guidance for enhancing sight-reading abilities in piano learners of various backgrounds and proficiency levels.

Mishra (2014), analyzed 92 quasi-experimental studies on sight-reading, evaluating various sight-reading interventions, revealing the most effective strategies to improve sight-reading ability. Interventions classified as "auditory training," "controlled reading," "creative activities," and "singing/scales" had significant positive effects on sight-reading. The study found that new perspectives in music training, emphasizing the understanding of musical structure and anticipation, were more effective. Rhythm is a fundamental element in music and an important component of visual reading. Some studies have highlighted the importance of rhythmic training in improving visual reading skills. Zhukov (2014), concluded that a combination of specialized training in rhythm, accompaniment, and musical styles is more effective in enhancing sight-reading levels. A study by Sloboda (1986), emphasized that rhythmic accuracy is crucial in sight-reading. Musicians who can accurately interpret and reproduce rhythmic patterns tend to have better overall sight-reading abilities. This is because rhythm provides the temporal framework for melody and harmony structures. Rhythm should be a primary focus when developing music reading skills (Fiske, 1969).

Watkins (1984), explored the impact of rhythmic training techniques on sight-singing ability. She studied 22 university music students, dividing them into two groups over a ten-week experiment: one group received traditional sight-singing accompaniment instruction, while the other group used recordings of solo sight-singing for accompaniment. Pre-tests and post-tests showed significantly higher rhythmic accuracy scores in the experimental group. Despite similar performance in pitch accuracy and expressive accuracy between the two groups, Watkins concluded that this approach was highly effective in improving rhythmic accuracy. She suggested integrating real accompaniment scenarios in teaching, which is particularly suitable for students of different ages.

Boyle (1970), investigated the importance of rhythmic imagery in the sight-reading process. The experiment involved 24 junior high training bands, divided equally into experimental and control groups. The experimental bands used body movements, such as foot tapping to mark the basic beat and hand tapping to practice rhythmic patterns, as auxiliary means for learning and practicing rhythm. The control group was not allowed to use

these body movements during training. The results showed significant differences between the two groups, with the experimental group scoring significantly higher on both standard measures.

Numerous studies have shown that the cultivation of pitch concepts may improve melodic sight-reading ability more than traditional technical skills training. Reading and performing music require understanding two main musical elements: pitch and duration (Russell, 2016). Pitch recognition and reproduction are equally important in the sight-reading process. The ability to quickly identify and accurately execute pitch is a skill that can be developed through targeted strategies. Grutzmacher (1987), found that pitch training improved melodic sight-singing scores among beginner instrumentalists when comparing courses emphasizing pitch concepts versus technical skills. In this study, the experimental group learned pitch patterns through harmony and syllable singing, using training materials that included long tones, scales, and arpeggios, while the control group used traditional technical skills teaching methods. The results showed that the experimental group scored significantly higher in melodic sight-reading.

Zhukov, (2014), evaluated the sight-reading teaching methods for advanced pianists to study strategies for improving sight-reading skills. Three new training programs (accompaniment, rhythm, music style) were implemented with a control group, involving a total of 100 pianists. Customized software was used to analyze pre- and post-training sight-reading tests, finding that all training groups showed improvement in either rhythm or pitch, while the control group also made progress in pitch.

Yang (1994), explored the importance of sight-singing in shaping musical auditory representation abilities and its impact on sight-singing performance, observing a correlation between students' ability to play melodies and their accuracy in vocalization. The study participants were beginner piano students aged 6 to 9, and the process involved subjects receiving training in singing scales, rhythmic movement, or a combination of both. Results showed that students who received scale singing training or a combination of scale singing and rhythmic movement training demonstrated significant achievements in pitch discrimination and melody playback, while participants in the control group without such guidance performed poorly.

The impact of accompaniment on improving sight-reading abilities is also a direction researchers strive to verify. Lehmann and Ericsson (1993), studied 16 pianists, finding that students with more accompaniment experience consistently performed better in sight-reading compared to those who primarily practiced and performed solo pieces. Watkins conducted two experimental studies on the effect of accompaniment on enhancing sight-reading skills. One study in 1984 investigated the impact of rhythmic training techniques on sight-singing ability. The experiment involved 22 university music students divided into two groups: one group received traditional sight-singing accompaniment instruction, while the other group accompanied the sight-singing through recordings of soloists. She compared the sight-singing skills of both groups and found that the experimental group's rhythm accuracy scores were significantly higher.

Lehmann, & Ericsson (1996), focused on musicians' ability to sight-read and accompany without prior preparation, analyzing the impact of comprehensive piano skills, accompaniment experience, and repertoire quantity on sight-reading and accompaniment performance through experimental tasks and interview data. The results showed that while technical training and careful preparation are crucial for solo performance, accumulated accompaniment experience and expanding relevant repertoire are also key factors in improving sight-reading and accompaniment skills. Accompaniment experience was found to be crucial for the development of sight-reading skills, emphasizing the role of challenging practice and self-improvement rather than merely practice time.

Rubinstein (2022), delved into pianists' sight-reading and memorizing skills, analyzing the components of sight-reading such as note recognition, rhythm comprehension, and musical structure, as well as the basic steps of sight-reading, including understanding score elements like clefs, key signatures, time signatures, and tempo, and recognizing notes, chords, and musical frameworks. Emphasis was placed on the key components of memorizing music. Various sight-reading training methods for different levels of pianists were provided, advocating for frequent practice and understanding of classical works to enhance sight-reading abilities. Strategies that involve musical understanding, practice, and comprehensive sensory engagement were highlighted as ways to help piano learners more effectively master new works while deepening their understanding of the essence of music.

Many researchers have attempted to use music theory to enhance sight-reading abilities. Gardner (2000), argued that even those with naturally lower musical intelligence could improve through targeted training using other forms of intelligence. Liu (2010), proposed a method to analyze and evaluate pianists' cognitive skills based on the theory of multiple intelligences. He used Gardner's theory as an organizing framework, providing a new perspective for analyzing various piano skills. His research on the detailed analysis of piano techniques aims to help pianists construct their intellectual profiles, thereby better identifying and addressing performance issues. He believes that this approach is not only applicable to advanced pianists but can also be extended to pianists of other levels and even other instruments, offering new tools for self-assessment and teaching.

Chapman (2023), conducted a study based on Gardner's multiple intelligences theory, emphasizing different musical learning strengths and positing that musical intelligence is primarily built on auditory intelligence. He focused on the difficulties piano students encounter when simultaneously reading and playing music, aiming to define and develop an easily understandable musical intelligence framework to support piano teachers' instructional practices, particularly in teaching simultaneous reading and playing of piano scores. The study found that simultaneous reading and playing require strong proprioceptive, kinesthetic, and tactile skills, as well as reliable musical spatial intelligence and strong auditory intelligence. Teachers generally believe that the ability to read and play from a score is an important component of musical intelligence, while also valuing musical literacy and personal and interpersonal intelligence. Students exhibit different musical strengths, with some excelling in reading music and others in auditory learning and imitation, suggesting that music education should balance the development of these two abilities. Bodily-kinesthetic intelligence, the ability to effectively use the body, is crucial for playing instruments.

Song Dan (2018), explored the current state of sight-reading abilities among children learning piano in China. Based on perceptual, cognitive information processing, and multiple intelligences theories, she analyzed the physiological and psychological aspects of the sight-reading process, its rules, and characteristics. Additionally, she used experimental interventions to explore the effects of different methods on improving children's piano sight-reading abilities and the implications of American piano sight-reading materials for piano sight-reading teaching in China. Wu Fei (2014), based her research on the theory of multiple intelligences, exploring the correlations between musical, spatial, and kinesthetic intelligences in piano sight-reading. Through questionnaires, she studied music education students, and the results showed that these three intelligences are related in piano sight-reading. She proposed effective teaching strategies such as restructuring curriculum design, learning processes, and ability assessments. The study also found that musical intelligence has the highest correlation with kinesthetic intelligence, while spatial intelligence has a slightly lower correlation with kinesthetic intelligence. To improve piano sight-reading ability, the development and cultivation of musical, spatial, and kinesthetic intelligences should be emphasized, and courses and learning processes should be adjusted based on the principle of individualized instruction.

Wang Yufei (2021), pointed out that the composer's hints about the overall character and local emotional changes of the music are hidden in the structure of the music itself. For the sake of clarity in the discussion, we need to break down the overall structure of the music into structural elements such as harmonic form, melodic form, rhythm and meter, genre, texture, and tempo, and discuss their roles in shaping the character of the music. This makes "reading the score and recognizing the music" rational and evidence-based, helping sight-readers to conduct relevant training more scientifically and systematically.

Price et al (1998), advocated using the "music notation method" to directly use the works being prepared for performance in teaching, aiming to improve students' musical understanding through actual music. He explored the effects of two teaching methods, traditional basic exercises (scales, etudes) and directly using music excerpts as teaching tools, on high school band students, especially their sight-reading ability, music performance skills, and learning attitudes. It was found that the music excerpt group performed well in musical expression and had a more positive attitude.

Ku (2008), explored the importance of sight-reading in piano education, stating that frequent sight-reading practice can improve skills. Vertical reading, forward-looking eye movements, and good technique are key factors. Music theory knowledge, rhythm control, and concentration are crucial for enhancing sight-reading ability. Excellent sight-readers are trained rather than born with this ability. Ku also emphasized that the readability of sheet music affects the performer’s acceptance, and editors and publishers have a responsibility to ensure ease of reading in font selection, spacing, and notation.

Sezen (2021), analyzed the teaching methods and materials used in basic piano education for children aged 4 to 6, emphasizing the adaptation of note reading to the children's visual, auditory, and psychomotor learning processes by viewing notes as graphic structures. Sezen proposed gradual, detailed teaching stages to address how to most effectively teach children to read piano music. Teachers should have the ability to implement

step-by-step methods, mnemonic techniques, visual materials, and innovative teaching activities to successfully teach young children piano reading. Designing teaching steps that fit children's developmental stages and breaking down note reading skills promote systematic and lasting learning. Innovative use of graphics, arrows, and colors as visual tools enhances children's overall perception of melody direction and musical structure, optimizing the establishment of triple perception relationships.

Salis (1980), studied the effect of the relationship between the visual field and brain hemispheres on the recognition of musical symbols and dot patterns. By comparing the effects of musical symbols and dot patterns in the left and right visual fields, Salis researched the brain lateralization effect of music reading. This study used two types of visual field experiments, one with random dot patterns and the other with musical chords, comparing the excellent and poorer groups among advanced piano score readers. Results showed significant effects for dot patterns in the left visual field and chords in the right visual field, indicating that music symbol recognition relies more on the left brain. For chords, the excellent group outperformed the poorer group, showing a practice effect, and the way music information is processed may influence the mediating role of brain hemispheres.

Pike (2012), explored the importance of piano sight-reading and provided strategies and practical methods to improve the sight-reading abilities of beginners and intermediate piano students. He advocated developing musical skills through perception and cognitive chunking and suggested using drills to enhance sight-reading perception and hand-eye coordination. Pike recommended using melody notes, chord block exercises, and sight-reading flashes to strengthen musical memory. Additionally, he emphasized the teacher's role, advocating for specially designed practice drills to help students improve their sight-reading levels. Piano education should emphasize sight-reading training, utilizing a variety of practice tools and methods to help students better understand and interpret musical works.

Hagen, Benson& Cremaschi (2007), compared the effects of three different types of software eye-guides (grid lines, whole bar highlighting, and sliding thin bars) on improving students' sight-playing skills in college piano lessons. The results showed that students' sight-reading performance improved significantly over time, but the differences between and within groups were not significant.Sight-reading ability involves symbolic perception, cognitive processing of visual information, and movement generation, and is affected by a complex interaction of multiple factors, including physiological co-ordination, musical awareness, musical potential, and musical experience. Excellent sight-readers showed common characteristics such as fewer pauses due to errors, finer keyboard touch, consistent finger use, greater anticipation and planning, and attention to melodic contour, rhythm, and tempo. All groups significantly improved their sight-reading skills over time, but there were no significant differences between groups, suggesting that both regular training and software use may contribute to improving sight-reading skills

Kopiez& In Lee (2008), explored the use of musical sight-reading in Western classical music culture. The study classified the component skills involved in sight-reading into three categories: general cognitive skills (e.g., working memory, short-term musical memory, etc.), basic cognitive skills (e.g., tempo tapping, simple reaction time, etc.), and practice-related skills (e.g., solo practice, sight-reading, and inner listening). The results suggest that excellence

in sight-reading is a combination of practice-related (e.g.,sight-reading experience and inner hearing) and practice-irrelevant (e.g., information processing speed) factors. The proposed 'general model' complements the 'dynamic model' that appeared in previous journals and provides a more comprehensive framework for understanding the complex processes involved in musical sight-reading, finding that sight-reading expertise, speed of information processing and inner hearing before the age of 15 are the main predictors, shedding light on specific cognitive skills and key developmental periods. The impact of specific cognitive skills and critical developmental periods on sight-reading achievement is revealed.

Conclusion

Researchers have provided guidance and reference through various forms of research, whether it is from musical elements such as rhythm, pitch, accompaniment, and singing, or from psychological perspectives such as perception, auditory, and spatial intelligence, or from music learning theories and learning forms. The review of literature on the possibility of Sight-Reading improvement suggests that *the use of rhythm, accompaniment, pitch, some learning theory strategies, through mental rehearsal and feedback can help to improve the reading effect. However, more research is needed to explore the long-term effects and individual differences in visual reading ability.*Various methods and approaches have been explored in empirical studies, indicating the effectiveness of specific practice techniques and cognitive processes in sight-reading improvement. While the findings highlight the potential for significant improvements in sight-reading skills, further research is necessary to investigate long-term effects and individual differences in sight-reading ability. Additionally, future studies could explore the integration of technology and innovative teaching strategies to further enhance sight-reading proficiency among musicians.n addition, further research is necessary to study the effectiveness of different promotion strategies, and it is necessary to adopt empirical research means to effectively integrate the promotion strategies into specific training.In the design of training materials, make full use of the selected strategies and methods to achieve real and effective.

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