

## APPLICATION AND ASSESSMENT OF DIGITAL RESOURCES IN THE EDUCATION OF FUTURE PEDAGOGUES

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**Abstract.** The continuous advance of technologies and their implementation across all stages of education leads to the development and creation of a variety of digital resources that can be a useful part of contemporary education aiming to develop the digital competencies of the students – future pedagogues. As part of the lectures and workshops on “Kindergarden music theory and methodology”, “Musical education in preschool” and “Musical diagnostics in preschool and primary school grades” students (prospective teachers) who were enrolled in education program of University of Ruse were introduced to a variety of digital resources aiding their practical training. During this time, the students acquired additional knowledge on how to apply them in their future teaching practice. The current study shows a poll of students’ opinion on the usefulness of the test “Profile of Music Perception Skills”, the model “Geneva musical emotional scale”, interactive study materials on “General music training”, video lessons on “Musical theory and methodology” and interactive slide on other sources used in their education. A dedicated questionnaire has been used for data collection of this study.

*Keywords:* digital resources; music education; musical diagnostics

### 1. Introduction

The research in various thematic areas over the past decade shows that digital competence is essential for the development of many aspects of our lives. It is one of the key competencies that both students and teachers should acquire and develop during their primary education. In the context of the established competency approach, its development is achieved through the use of digital resources in teaching students in all disciplines, not just in “Information Technology”.

The continuous improvement of technologies results in the development and creation of a variety of digital resources that can be used at different stages of modern education, thus contributing to the digital transformation of education. At the same time, “a large proportion of students are tech savvy and know how to use technical tools for various

purposes such as writing notes, creating a presentation, playing games, watching video, creating photos, etc.” (Radev 2023). By providing new learning opportunities and methods, digital technologies have the potential to change the educational process, such as: real-time feedback; enrichment of learning materials; motivation; preparing for the future. (Doncheva, Asenova, Ivanova 2023) The question is whether they are motivated to use the possibilities of technology in their practice. Existing hesitations among specialists about whether teachers are aware of the wealth of electronic resources, whether they can effectively integrate them into their work with students, and to what extent teachers themselves can create electronic resources to support the learning process (Chavdarova-Kostova 2023) are incentives to study student opinions regarding the accessibility and usefulness of digital resources implemented in their training process and their ambition for using similar tools in their future work as teachers.

## **2. Overview**

Students – future teachers in “Preschool and Primary School Pedagogy” (Bachelor's degree) and “Modern Educational Technologies in Kindergarten and Primary School” (Master's degree) at Angel Kanchev University of Ruse were introduced to a variety of innovative tools during their lectures and seminars on the “Theory and Methodology of Music in Kindergarten,” “Methodology of Music Education in Primary School,” “Diagnosis of Musicality in Preschool and Primary School Age” disciplines.

Employing innovative means for effective education provides:

- introductory to current digital resources to specialists in the fields of music theory, music psychology, and music pedagogy to work and conduct scientific research;
- easier and more accessible knowledge in the disciplines of their study;
- visual understanding of the possibilities and functions of selected digital resources and application in the teaching practice.

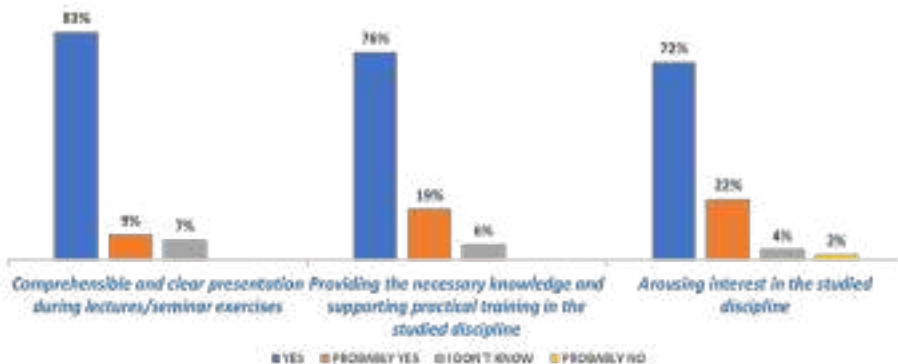
Innovative tools in learning can include various technologies and resources that improve the learning process: online platforms and tools for communication and collaboration; interactive whiteboards and other presentation devices; educational softwares and applications; virtual and augmented reality; games and simulations for learning (Rashidov, Rashidova, Ilarionov 2023). This report presents various digital resources through which students in the above disciplines are taught, as well as assessment of their opinion on the usefulness of the resources and their preferences for using similar tools in future work as teachers in Kindergarten and/or Primary school. The data were collected with a questionnaire specially designed for the study. The surveyed students were aged between 20 and 56 years old, with 98% of them being women and 2% men. At the time of the survey, 72% hold a Bachelor's degree and 28% hold a Master's degree obtained at Angel Kanchev University of Ruse and its branches in Vidin, Silistra, and Razgrad.

### **Test Profile of Music Perception Skills**

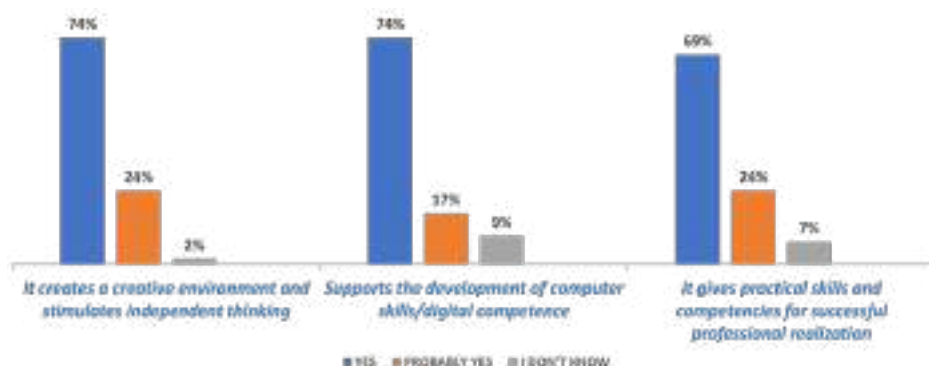
Measuring musical skills and abilities has long been of interest to researchers of many generations (Stumpf, Seashore, Mayer, Revesh, Kualwasser, Dickem, Drake, Teplov, Vetlugina, Gordon, Wing, etc.), who created and validated approved standardized tests – test batteries for the detection of musical skills. Initially, these batteries were often developed in the context of music education, for example, to identify children who were gifted to receive a formal music education. (Georgi, Gingras, Zentner 2023). Each of them has contributed with their work to the development of methods of researching musical abilities and the establishment of the diagnosis of musicality as leading in measuring the effectiveness of educational content in music programs for general education preparation. Diagnostic is used both in checking the musical abilities of children and students during music lessons, extracurricular activities in music schools, training in a music school, and also in the training of future teachers. The topic of musical abilities and their measurement is relevant in the modern education, as they are necessary for the pursuit of musical activities.

The “Profile of Music Perception Skills” test is a new musical test battery that objectively measures music perception skills in various categories – melody, pitch, timbre, rhythm, metric accent, tempo, and loudness. Participants in the test should indicate whether the presented samples are the same or different (Zentner & Strauss 2017). The test is suitable to assess both musicians and non-musicians. For the purposes of the studied disciplines, this digital resource is used in teaching topics related to music theory, music psychology, and musicality diagnostics.

The following Graphs 1.1 – 1.6 present the students' assessment of the Test Profile of Music Perception Skills in terms of its accessibility and usefulness in acquiring knowledge and developing digital skills, stimulating of interest, and understanding possibilities and function in their future teaching practice. The obtained results show favourable opinion of this digital resource.



**Graphs. 1.1, 1.2 and 1.3**



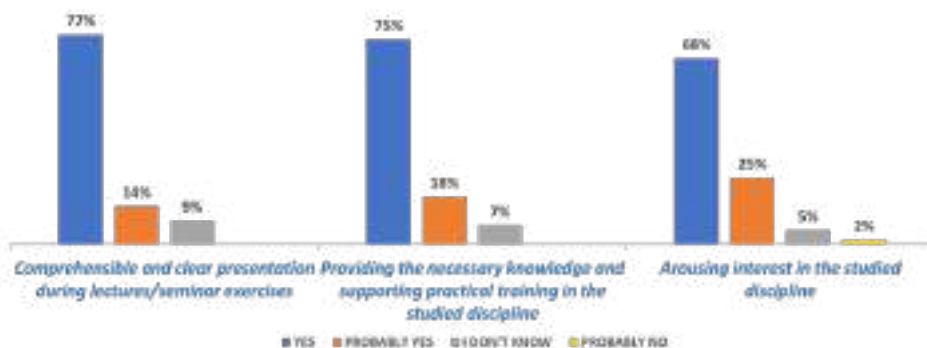
Graphs. 1.4, 1.5 and 1.6

### Geneva Emotional Music Scale Model

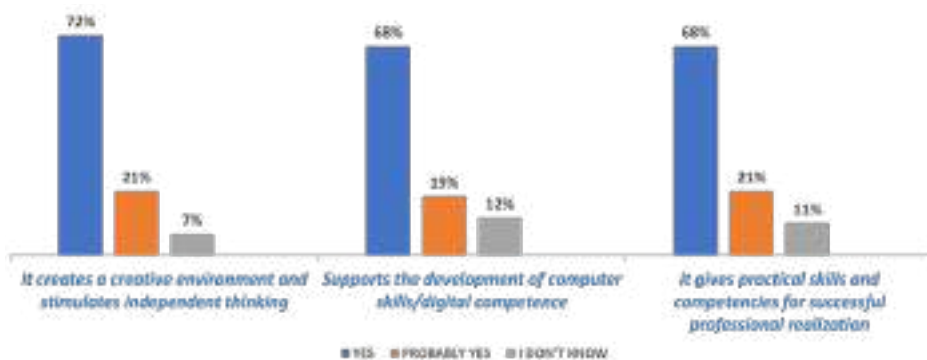
The model is specifically designed to capture the richness of emotions elicited by musical compositions. It consists of nine categories of emotions elicited by music: wonder, transcendence, tenderness, peacefulness, nostalgia, joy, power, sadness, tension. To ensure that the data for each musical excerpt is reliable, the number of listeners necessary to obtain a stable assessment of the emotional effect of each musical excerpt has been statistically determined. (Troost, Ethofer, Zentner, Vuilleumier 2012). The model is used for studying the expressive means of music and their interconnection. Presenting them precisely in this way is extremely valuable, since “removing the scale, the metrorhythm, the harmony, the pitch side of the melody immediately destructures the entirety of the music, divides it into elements and actually destroys the idea of music as a living, spiritual art.” (Stoyanova 1991). Students examine and study the emotional states elicited in the listener observing various combinations of elements of musical expressiveness (described in the Bulgarian Educational Standards for Preschool and Primary School Children). This way they develop skills that will enable them better help their future students in the classroom to identify their emotional state. A better understanding of the emotions will reduce the level of anxiety of the pupils and will increase their motivation to learn (Beloeva&Antonova 2023). At the same time, they are led to share the pictures that their imagination paints, since “in the perception of music, the imagination has too great a place and role, which is defined as transformative, i.e. transforming the ideas and knowledge held in the mind and memory of the person to create the new images. This is done on the basis of the person's ability to transform the musical expressive means used by the author in the specific musical work” (Atanasova-Vukova 2014). This is a task that they will also carry out in their teaching practice. The emotions in the model are represented through a variety of musical works in different styles: rock, pop, jazz, classical, hip-hop, funk/soul, electronic. That is why the model is also a music library with a variety of musical pieces. In the latest version developed

by the team, artificial intelligence was also used. Using the GEMS-Model, ChatGPT was capable of rating music emotionally in a way that comes quite close to ratings of real listeners.

Below are Graphs 2.1 – 2.6 that show that the students find the resources useful and applicable in practise.



**Graphs. 2.1, 2.2 and 2.3**



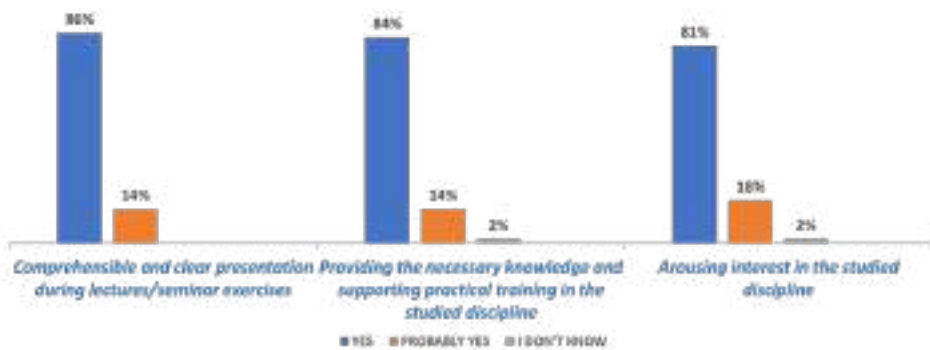
**Graphs. 2.4, 2.5 and 2.6**

### **Video lessons**

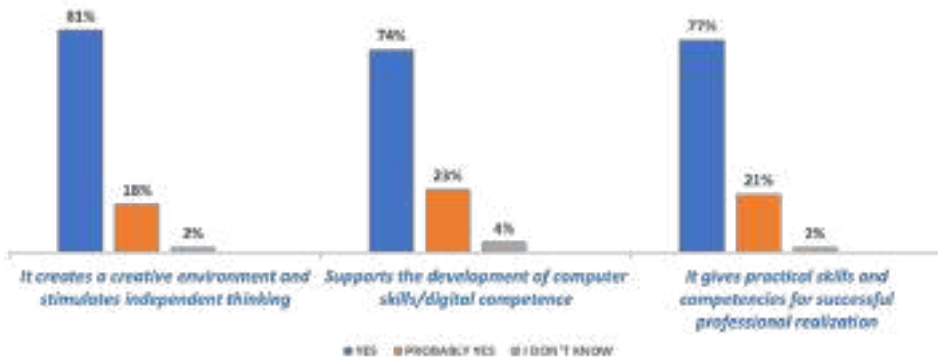
The video lessons used in lectures and seminar exercises in “Theory and Methodology of Music for kindergarten and primary school” are from established sources with excellent reputation in the educational field. Their duration depends on the goals of the video content. Students' preference for the length of video lessons has been researched by Ivanova and Ibriyamova team: “micro-content should be presented mostly in the form of a short video, short text with images or just an

image to suit the students' preferences and attitude” (Ivanova, Ibriyamova 2023). The videos are available online and are particularly important for the preparation of future teachers as they present good practices of contemporary teaching methods and approaches. Watching and discussing them would enhance students' interest and enrich the opportunities for using digital tools in a real-life educational.

The following Graphs 3.1 – 3.6 present students' assessment of the video lessons through which they learn and reinforce the learning material on music theory and methodology.



Graphs. 3.1, 3.2 and 3.3



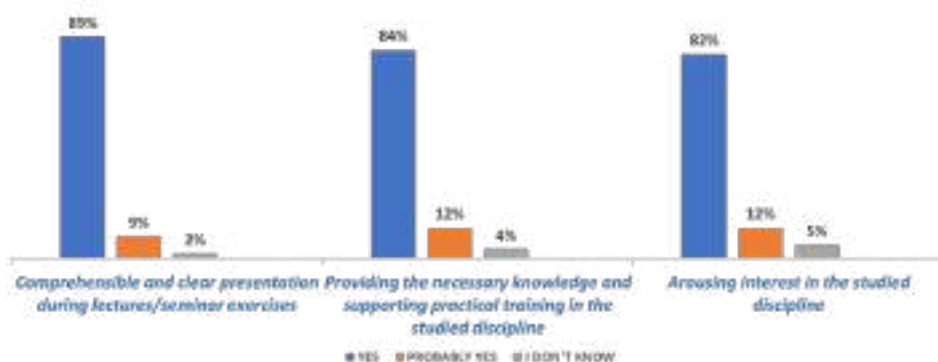
Graphs. 3.4, 3.5 and 3.6

### Digital educational music games

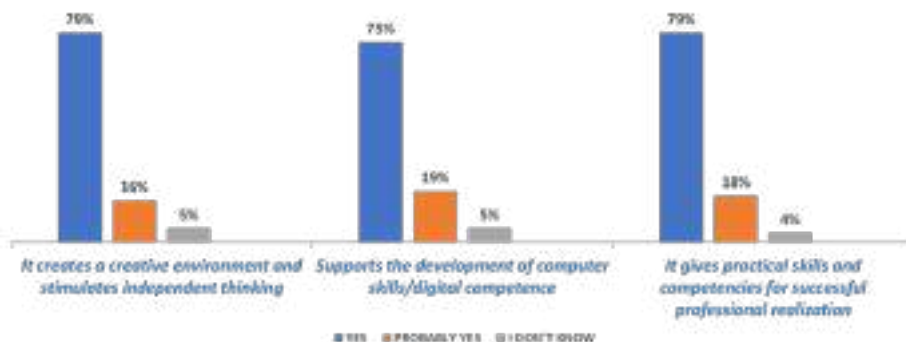
Digital educational music games are another interactive and internet-enabled way to reinforce students' knowledge in music theory elements. They are equivalent to the textbooks and manuals on the theory of musical elements, but in comparison

with them, they create an even richer, creative and fun environment during lectures and seminar exercises. Their essential advantage is that they are suitable for teamwork and can simulate online connection between several participants. This is possible due to technologies that are increasingly being implemented in music education and “can be used to carry out collaborative musical projects between participants located in different parts of the world” (Stefanova 2023)

The following Graphs 4.1 – 4.6 present the students' view on the use of digital education music games in their preparation for the disciplines. Majority of the students find them helpful.



**Graphs. 4.1, 4.2 and 4.3**



**Graphs. 4.4, 4.5 and 4.6**

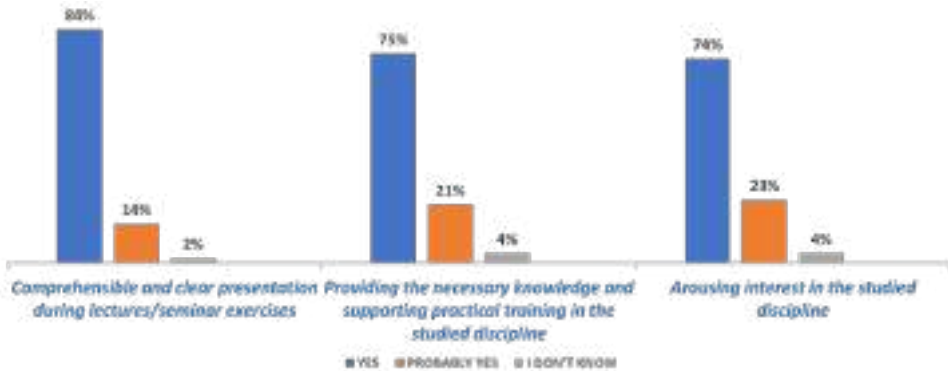
### **Electronic textbooks and knowledge books**

Advances in technology provide modern teachers with the ability to teach through electronic, interactive, multimedia, and Internet-connected textbooks. They are suitable for learning both, face-to-face and also remote – synchronous

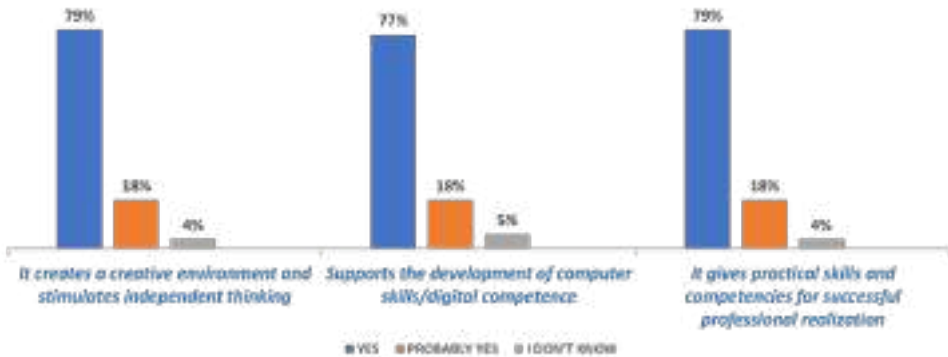
or asynchronous educational environment. Music e-textbooks and knowledge books contain built-in short video lessons, interactive tasks and tests, virtual tours, animations, song recordings, riddles, works of art, texts and exercises in foreign languages, photo and picture galleries, dictations, etc. In this modern educational environment, learning is more enjoyable and more effective.

The students' assessment of the e-textbooks and knowledge books used in their training in the disciplines is positive (Graphs. 5.1 – 5.6).

Students estimate the usefulness of the presented educational digital resources as: modern educational approaches; excellently selected and organized; extremely useful, offering diverse learning methods; always accessible, making them convenient for independent learning and preparation; very beneficial for professional development; providing practical skills and competencies; useful with a lot of additional information.



Graphs. 5.1, 5.2 and 5.3



Graphs. 5.4, 5.5 and 5.6



### **3. Conclusion**

The present study demonstrates that the use of digital resources in music education creates an internet-connected, multimedia, interactive environment in which students show greater interest in the studied disciplines, and the educational material is absorbed more effectively. The modern student of the digital generation requires the use of digital resources during to study, through which specific skills will be developed, interest and curiosity to the educational content will be provoked. This will increase their knowledge in technology and motivation to teach.

### ***Acknowledgments & Funding***

This study is financed by the European Union – NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project № BG-RRP-2.013-0001-C01.

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