Use of ICT as a Music Teaching Material Development Tool

Febbry Cipta[(✉)], Juju Masunah, and Rita Milyartini

Sekolah Pascasarjana, Universitas PendidikanIndonesia, Bandung, Indonesia
`febbrycipta77@upi.edu`

Abstract. This study aims to describe the use of ICT as a music teaching material development tool. The research design used a cross-sectional survey with a sample of 112 high school music teachers in Bandung City. Data collection was carried out through a self-assessment questionnaire in terms of, 1) external factors including, the use of types of hardware, software, and social media platforms, and 2) internal factors including, knowledge and ability to use music composing software, ICT-based pedagogic competencies and development implementation ICT-based teaching materials. Data were analyzed quantitatively using a Likert scale, then categorized. The results show that, in general, each indicator in the first factor scores in the high category. Each of these achievements is motivated by, 1) the ability and willingness of teachers to have ICT facilities with specifications following the developments and needs of the times, 2) efforts from schools, government, and the private sector in procuring and enriching ICT facilities, 3) training activities that been followed, and 4) the emergence of various social media platforms that can be used in education. As for internal factors, the average score is obtained for, 1) indicator-1 = 40.29%, 2) indicator-2 = 20.10%, and 3) indicator-3 = 20.03%.

Keywords: Music Education · Teacher · ICT · Survey · Music Software

1 Introduction

Various inventions and technological developments in music education have changed the perspective and way teachers make learning materials [1, 2]. Today's teacher view that, to build student awareness of 21st-century competencies, the student-centered learning process that has been carried out so far needs to be integrated with ICT advances, in showing how it works, ICT advances make it easy for teachers to obtain references from various sources. to create and deliver material to students [3].

Learning material has a core role as a tool built with comprehensive information for the learning and teaching process to take place [4]. Because, starting from the material, teachers can develop strategic plans to implement work steps, function learning media, utilize learning support facilities, and develop evaluation tools. Based on the opinion of Gordon [5] then the music-learning process must be built by material that presents musical attributes to be conveyed to students, so that it can optimally assist the audition

process. This is based on the purpose of learning music itself, namely to build and develop students' musical knowledge and skills through the audition process.

In general, the preparation of music learning materials by high school music teachers in the city of Bandung refers to textbooks Seni Budaya published by Curriculum Center and Bookkeeping, Ministry of Education and Culture, Republic of Indonesia. Each teacher tries to compile teaching materials by taking an approach to local music and current issues regarding trending music and students' interest. In the process, these teachers arrange musical materials using computer-based applications (music composing software), by utilizing the features provided in the application it uses. Of the various computer applications referred to, researchers distinguish between two types of music-composing software that is engraving tools, and digital audio workstations (DAW). This difference is reviewed from the advantages of each type of software [6–8].

This type of software engraving tools is widely used in writing musical notation. It includes artificial intelligence features that allow users to apply musical attributes, including dynamics, ornamentation, melodic patterns, rhythms, harmonies, techniques, and so on. This type of software is also equipped (can be integrated) with virtual instruments that can present sound realistically. As for the type of DAW, this software is a development of analog devices used for sound recording, editing, mixing, and music mastering. Generally, this type of software is equipped with effects (FX) features that are used to process and organize sounds such as equalizers, compressors, reverbs, delays, and distortions. Besides being equipped with artificial intelligence features that can be used for the development of musical compositions, the addition of virtual instruments with realistic sounds can be used as sound simulations in a composition.

Through observations in several schools and interviews conducted with several teacher representatives, the researchers obtained an overview that the school and the Bandung City Education Office had made efforts to procure and enrich ICT facilities, both for updating computer hardware and software, as well as for network strengthening. Meanwhile, in several schools, the private sector has the opportunity to take part in procurement and enrichment activities. On the other hand, apart from providing and enriching infrastructure, activities in the form of ICT training organized by various parties such as the Education Office, the private sector, and members of community groups, play an important role in efforts to strengthen competency standards for music teachers (pedagogic, personality, professionalism, and social) through the use of ICT.

This research was conducted as an initial step towards developing music learning media that can strengthen the substance of the material through the presence of sound as well as the realistic context of music. In general, music teachers in the city of Bandung have used ICT facilities for various learning purposes, but this still needs to be expressed concretely through the latest, measurable and written data.

The reasons for selecting respondents and research location are, apart from being a big city, the dedication of the city of education to Bandung had started in 1866 since its founding Hollandsch Inlandsche Kweekschool (Indigenous Teacher Candidate Education School). So that the embedding that has been in effect until now, is also supported by the active role and competence of the teachers [9].

Research on the use of ICT facilities in various branches of education is an interesting theme to study. So that in this digital era, it is not difficult for anyone to obtain information

about how it works and the results of various studies that have been carried out by other people. As for this article, the author intends to convey a discussion of the results of a survey on the use of ICT in the field of music education, whose novelty can be viewed in terms of the branches of education, in terms of space and time, actors, as well as ICT devices used in the field of music creation itself.

2 Methods

This study was designed using a mixed-methods approach [10] with a sample of 112 music teachers taken from 148 populations. The population and samples were taken from alumni teachers of the Music Education Study Program, Universitas Pendidikan Indonesia, who teaches at the high school level in the city of Bandung. Taking the number of samples using a sober sampling technique [11]. Through the data obtained, 148 targeted alumni work as music teachers. Of these targets, 112 questionnaires were responded to and returned to the researcher, which the researcher then considered as a sample.

The type of survey used in this study was cross-sectional, in which the observation of the population and samples conducted by the researcher was carried out by distributing questionnaires in one data collection. Measurements are made through a percentage scale with the following categories,

The validity test of the instrument was carried out by 10 expert judges from lecturers (2 people), and teachers (8 people) (Table 1). The instrument is composed of indicators that are grouped into two factors, namely external factors, and internal factors. Indicators of external factors include the type of hardware, computer software, and social media platforms used. While indicators of internal factors include, 1) knowledge and skills in music composing software, 2) pedagogical competence in the context of teaching, and 3) implementation of developing ICT-based teaching materials. The questionnaire items in this internal factor adapt the operational verbs in HOTS [12, 13]. Calculation of the validity test of the items on each factor was carried out using the product-moment correlation.

The significance level used in this measurement is 0.05 (in a one-way test), where the number of instrument validator data is 10 people. When referring to the r-table, the degree of freedom (df) obtained is 0.54. The average number of t-counts for measuring the number of instrument items with the number of respondents in this validity test is 0.72. So that the comparison between the t-counts and r-table is $0.72 > 0.54$ (status declared valid).

This survey instrument is deliberately not equipped with indicators regarding gender and age. Because for researchers, neither gender nor age has a significant influence on

Table 1. Instrument rating scale (validity test).

Scale (%)	20–34	35–50	51–66	67–82	83–100
Category	VL	L	M	H	VH

Note: VL = very low; L = low; M = medium; H = height; VH = very high

the results of ICT utilization activities in the development of learning materials. This process is not like activities in sports competitions which consume a lot of energy, as well as stamina, which tends to affect differences in gender and age. In addition, indicators regarding the status and level of schools were not included in this survey because, between the status of public schools and private schools, and between middle and high school levels, in general Bandung City has ICT facilities with specifications following the developments and needs of the times. As for the absence of indicators regarding teacher status in this survey, due to the assumption of researchers that, in terms of the status of honorary teachers, civil servant teachers, and permanent employee teachers, all three have the same task as teachers, which in teaching requires the same skills, even in fact there are contrasting differences, especially in terms of the nominal aspect of the salary received, or other aspects that might affect their affection.

3   Discussion

There are two self-assessment factors surveyed, namely, external factors and internal factors. External factors consist of indicators regarding the use of types of hardware, computer software, and social media platforms, both in the production and delivery of material. Meanwhile, internal factors consist of indicators regarding knowledge and skills in using music composing software, pedagogical competence in the context of ICT-based teaching, and the implementation of developing ICT-based teaching materials. In an effort to understand more deeply about each of these data, the researcher conducted interviews with five informants from different schools, as well as made observations in these schools.

3.1   External Factors

Overall, respondents have computer facilities with specifications following the developments and needs of the times. Likewise with the network, each respondent subscribes to a data package regularly through a cellular provider on their cellphone, and/or subscribes to wifi with unlimited quota in their respective homes. While in every school, generally use the wireless type, with an average connection speed of 30 Mbps.

This discussion of external factors includes seven indicators which can be seen in the following Fig. 1.

Notes: 1) Hardware (laptop/Lp, personal computer/Pc, smartphone/Sp, tab/Tb); 2) Software (engraving tools/Et, digital audio workstation/Dw); 3) Linked social media accounts (youtube/Yt, instagram/IG, facebook/Fb, tiktok/Tt); 4) Distance learning platform/asynchronous (google classroom/Gc, Ruang kelas/Rk, Edmodo/Ed, schoology/Sc); 5) Distance learning platform/synchronous (zoom meeting/Zm, google meet/Gm, skype/Sp, cisco webex/Cw); 6) Online quiz (google form/Gf, quizizz/Qz, kahoot/Kh, wordwall/Ww); 7) Cloud storage for teaching materials (google drive/Gd, youtube music/Ym, soundcloud/Sc, spotify/Sf).

In the hardware indicator, there are four choice statement items regarding the devices used to make learning materials, namely laptops (Lp), personal computers (Pc), smartphones (Sp), and tabs (Tb). In this indicator, there are 104 respondents or 92.86%choseg
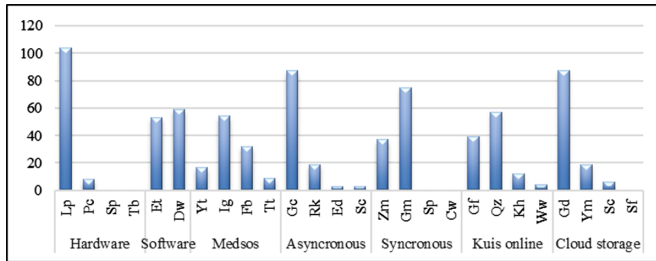
Fig. 1. Data on the number of respondents using computer devices and social media.

to use a laptop, and eight respondents or, 7.14% choose to use a PC. As for smartphones and tabs, no one uses them. If related to the interview data, it can be seen that the reason for using a laptop is, apart from its portability (compared to PCs), it also has a large data storage capacity (compared to smartphones and tabs). Even so, every respondent in his daily use of the four hardware. Respondents have used PCs (as school facilities in the teacher's office, or in the school computer laboratory) for various purposes including making learning materials. Likewise with the use of smartphones or tabs. In terms of the specifications of the hardware used, in general it has kept up with technological developments (up to date), adjusting to the needs of the times.

Regarding indicators of software use, 53 respondents or 47.32% chose to use the engraving tools (Et) type, and 59 respondents, or 52.68% used the DAW type (Dw). It can be said that the percentage gain for these two data does not show a wide interval, even tend to be very thin. When related to the interview data, each respondet uses the two types of software, but the frequency of use is relatively different for each respondent. So that does not rule out, for resents who choose to use Et, they also use Dw with the frequency as needed, and vice versa.

As for the third indicator regarding the use of social media accounts, a number of platform names contained in this questionnaire are platforms that are widely used in Indonesia [14]. The social media platforms used in this survey instrument are YouTube, Instagram, Facebook, and Tiktok. Referring to the chart above, 17 respondents or 15.,18% chose to use YouTube (Yt), 54 respondents or 48.,21% chose to use Instagram (Ig), 32 respondents or 28,.57% chose to use Facebook (Fb), and 9 respondents or 8.04% chose to use tiktok (Tt). The use of these platforms is more widely used as a medium for obtaining references, as well as a medium for sharing material with students in the form of infographics or video graphics.

The use of learning management system (LMS) facilities is one of the breakthroughs in the field of education that has been affected by ICT advances. With the various features provided, it is LMS platforms can bes media as well as virtual learning spaces that can be accessed remotely [15, 16]. In this survey, the LMS platforms used in asynchronous distance learning (DL) consist of Google Classroom, Ruang Kelas, Edmodo, and Schoology.

The largest number of users using the LMS for DL asynchronously in this survey is Google Classroom (Gc), namely 87 respondents or 77.68%. Whereas for classroom users (Rk) there were 19 respondents or 16.96%, Edmodo users (Ed) were 3 respondents or

2.68%, and schoology users (Sc) were 3 respondents or 2.68%. When linked to interview data, the high number of Gc users is not based on the features provided by Gc, which basically each platform has advantages over its respective features. So it can be said that the high number of Gc users is due to the fact that each respondent has a Google email account (gmail), which is directly connected to the Gc application.

In terms of utilizing the DL platform for synchronous learning (virtual face-to-face) data obtained, as many as 37 respondents or 33.04% chose,to use zoom meeting (Zm), 75 respondents or 66.96% chose,to use google meet (Gm), as for Skype (Sp) and cisco webex (Cw) did not vote. In general, the Zm and Gm applications are applications that are widely used by each respondent in the synchronous learning process. Even though the Zm application offers more features than GM, the high score of GM users in this survey is not based on the many features referred to. However, everything returns to what features are needed in the learning process.

In this survey there are online platforms that are generally used by teachers as a means of assessing learning outcomes (adapted to the writing of the Directorate of Junior High School Web Management, Ministry of Education and Culture, 2021), namely, google form (Gf), quizizz (Qz), kahoot (Kh), and Wordwall (Ww). For the use of Gf, there were 39 respondents or 34.82%, and Qz users were 57 respondents or 50.89. As for, kahoot users (Kh), there were 12 respondents or 10.71%, while wordwall users (Ww) were 4 respondents or 3.57%. In general, the four platforms presented in this survey are platforms that are popularly used in the education sector for the purpose of measuring student knowledge. Although each of these platforms has its own advantages, if you look closely Gf and Qz, the two have quite a contrasting appearance. The use of Qz is higher than Gf, as can be seen from the live interactive features on the Qz platform. Actually, this ability is the same as the features that kahoot has. Which in online quiz activities, invites students to compete actively and fun.

The final indicator for externahave l factors is the use of online data storage facilities (cloud storage). Adapting to Pertiwi (2021) [17], the platforms used in this questionnaire consist of Google Drive (Gf), YouTube Music (Ym), SoundCloud (Sc), and Spotify (Sf). The researchers use these platforms as media that are used to stream music material, store and share material in audio format. Data from the chart above shows that, 87 respondents or 77.68% chose to use Gf, 19 respondents or 16.96% chose to use Ym, 6 respondents or 5.36% chose to use Sc, and 0 respondents to Sf.

All respondents in compiling their learning materials were carried out by utilizing ICT facilities. There are differences in terms of the type of hardware, software, and platforms used. However, this difference places more emphasis on the element of subjectivity, in which the personal experience of each respondent influences their selection of the device they use, so not in view of the advantages of its features.

In terms of learning material, all respondents have developed and adapted the subject matter in the Cultural Arts package book. The intended development is the application of musical attributes (dynamics, ornamentation, duration, expression, etc.) to the material in the textbook which was previously given little attention. The adaptation is the implementation of local music that has local wisdom values into the subject matter. Both development and adaptation are meant to produce music creations by teachers in the form of written notations using software engraving tools, or through the process of

recording audio data, and editing using a DAW. Even so, researchers still find weaknesses in most teachers, namely in terms of optimizing the artificial intelligence features of each software, and the completeness of virtual studio technology that can actually be added to the software they use.

3.2 Internal Factors

The indicators included in the internal factors of this self-assessment include, 1) knowledge and skills in using music composing software, 2) pedagogical competence in the context of ICT-based teaching, and 3) implementation of developing ICT-based teaching materials. The statement items in each indicator refer to the operational verbs contained in Bloom's taxonomy HOTS. The measurement results of each of these indicators are as follows.

The 1st Indicator (i.1). Regarding self-assessment of knowledge and skills for music composing software, consists of 10 statement items, can be seen from Table 2.

From Table 2, it can be seen that, in terms of the ability to examine software characteristics, there are 22 respondents, or 19.64% in the very high category, 69 respondents, or 61.61% in the high category, and 21 respondents, or 18.75% in the medium category. In terms of the ability to compare the different features of music software, there are 22 respondents, or 19.64% in the very high category, 73 respondents, or 65.18% in the high category, and 17 respondents, or 15.18% in the medium category. In terms of the ability to select the features of the music software used, there were 23 respondents, or 20.54% in the very high category, 71 respondents, or 63.39% in the high category, and 18 respondents, or 16.07% in the medium category. In terms of exploring the development of music software features, 23 respondents or 20.54% are in the very high category, 75 respondents or 66.96% are in the high category, and 14 respondents, or 12.50% are in the medium category. As for combining work methods to optimize features, there were 23 respondents, or 20.54% in the very high category, 65 respondents, or 58.04% in the high category, and 24 respondents or 21.43% in the medium category.

Another ability contained in the statement items in this questionnaire is in terms of comparing the advantages and disadvantages of the VST used. There were 20 respondents or 17.86% in the very high category, 67 respondents or 59.82% in the high category, and 25 respondents or 22.32% in the medium category. In terms of deciding which VST will be used to make material according to its purpose, there were 22 respondents or 19.64% in the very high category, 71 respondents or 63.39% in the high category, and 19 respondents or 16.96% in the very medium category. In terms of the ability to measure musical aspects of the VST used, there were 23 respondents or 20.54% in the very high category, 73 respondents or 14.29% in the high category, and 16 respondents or 16.96% in the medium category. In terms of the ability to evaluate the quality of music learning material in terms of its substance, there were 24 respondents or 21.43% in the very high category, 66 respondents or 58.93% in the high category, and 22 respondents or 19.64% in the medium category. In terms of the ability to project material on music learning media towards 21st century competencies, there were 25 respondents or 23.32% in the very high category, 68 respondents or 60.71% in the high category, and 19 respondents or 16.96% in the medium category.

Table 2. Scores on indicators of knowledge and skills in music composing software.

No	Statement: "I can…"	The number of respondents on the scale					Number of respondents
		1	2	3	4	5	
1	Examine the characteristics of the software used	0	0	21	69	22	112
2	Comparing the different features of music software	0	0	17	73	22	112
3	Selecting the features of the music software used	0	0	18	71	23	112
4	Explore the development of music software features	0	0	14	75	23	112
5	Blending ways of working in optimizing features	0	0	24	65	23	112
6	Comparing the advantages and disadvantages of similar VSTs used	0	0	25	67	20	112
7	Deciding which VST to use in creating the material for its purpose	0	0	19	71	22	112
8	Measure the musical aspects of the VST used	0	0	16	73	23	112
9	Conduct an assessment of the quality of music learning material in terms of substance	0	0	22	66	24	112
10	Projecting material on learning media toward 21st century competencies	0	0	19	68	25	112

Notes: 1) VL; 2) L; 3) M; 4) H; dan 5) VH

The average score obtained in this indicator is 40.29 or 80.57%, so it is included in the high category. As for the highest score obtained on this indicator is 48, while the lowest score is 33, with a standard deviation of 4.10, which means that the range of variation of each sample is close to the average. The categories obtained are the impact of the teacher's active role in participating in training activities, which of these activities are used as a medium for interaction between teachers in implementing the results of their training. This interaction is present as part of the school culture which is connected to the self-commitment of teachers in an effort to construct their competence. Referring to [18], this ability is also inseparable from the role of the Principal who is active and cares deeply about the importance of enriching ICT facilities in schools, and developing teachers' abilities to use ICT.

The 2nd Indicator (i.2). Regarding self-assessment of pedagogical competence in the context of ICT-based teaching, can be seen from Table 3.

Based on the Table 3, it can be said that each statement item is in the high category. In terms of compiling and setting goals in making music learning materials, out of 112 there were 57 respondents or 50.89% who were in the high category. In terms of formulating effective and efficient learning materials, there were 59 respondents or 52.68% who were in the high category. In terms of combining musical aspects in the learning materials that were made, there were 59 respondents or 52.68% who were in the high category. In terms of constructing material into learning media, there were 58 respondents or 51.79% who were in the high category. In terms of compiling effective learning media, there were 62 respondents or 55.36% who were in the high category. Overall, from the total sample scores on the statement items, an average score of 80.39% is obtained or is in the high category, with a standard deviation of 2.59 which indicates the range of sample variations is close to the average score.

In interpreting each score obtained, if it is related to the results of interviews and observations, it can be said that, in fact, each respondent has carried out the activities mentioned in the points of the statement above. One of them can be seen in the teaching tools they have. In terms of setting goals and strategic planning for ICT-based material, a number of statements in it refer to learning tools which each respondent already has, such as syllabus, lesson plans (RPP), student worksheets (LKPD), and assessment Guidelines. However, when it is related to aspects of the use of ICT facilities, it is still found that around 22% of the sample is in the medium category.

The 3rd Indicator (i.3). Regarding self-assessment of the development of ICT-based teaching materials. The items in this indicator consist of five statements, as Table 4.

Table 3. Scores in indicators of pedagogical competence in the context of ICT-based teaching.

No.	Statement: "I, am able…"	The number of respondents on the scale					Number of respondents
		1	2	3	4	5	
1	Arrange and set goals in making music learning materials	0	0	29	57	26	112
2	Formulate effective and efficient learning materials	0	0	24	59	29	112
3	Combining aspects of music in the learning materials made	0	0	24	59	29	112
4	Constructing material into learning media to motivate student learning	0	0	28	58	26	112
5	Developing effective learning media in accordance with the subject matter to be conveyed	0	0	22	62	28	112

Notes: 1) VL; 2) L; 3) M; 4) H; dan 5) VH

Table 4. Scores on ICT-based teaching material development indicators.

No.	Statement: "I, am able…"	The number of respondents on the scale					Number of respondents
		1	2	3	4	5	
1	Develop work instructions in using the learning media created	0	0	18	71	23	112
2	Develop a media quality assessment plan for student learning outcomes	0	0	20	70	22	112
3	Clarify additional information about the intent and purpose of the media	0	0	32	67	13	112
4	Collecting VST features to revise the learning media that is made	0	0	18	66	28	112
5	Reconstructing the shortcomings of the implemented learning media	0	0	22	63	27	112

Notes: 1) VL; 2) L; 3) M; 4) H; dan 5) VH

Referring to Table 4, the first is compiling work instructions using the learning media that was created, there were 18 respondents or 16.07% included in the medium category, 71 respondents or 63.39% in the high category, and 23 respondents or 20.54% in very high category. Then for the statement items, drafting a media quality assessment plan for student learning outcomes, there were 20 respondents or 17.86% in the medium category, 70 respondents or 62.50% in the high category, and 22 respondents or 19.64% in the very high category. As for the statement items, clarifying additional information regarding the intent and purpose of the media, 32 respondents or 28.57% were obtained in the medium category, 67 respondents or 59.82% in the high category, and 13 respondents or 11.61% were in the very high category. As for the statement items, collecting VST features in order to revise the learning media that is made, 18 respondents or 16.07% in the medium category, 66 respondents or 58.93% in the high category, and 28 respondents or 25% in the very high category. And, finally regarding the statement items, reconstructing the deficiencies of the implemented learning media, there were 22 respondents or 19.64% in the medium category, 63, respondents or 56.25% in the high category, and 27 respondents or 24.11% were in the very high category.

The average score obtained from each indicator is 40.29 for the 1st indicator; 20.10 for the 2nd indicator; and 20.03 for the 3rd indicator. The maximum scores for each of these indicators are 48 (i.1), 24 (i.2), and 24 (i.3), with a minimum score of 33 (i.1), 16 (i.2). 16 (i.3). In order to obtain a percentage score for the three indicators, 80.57% (i.1), 80.38% (i.2), and 80.11% (i.3), which are included in the high category. Data on the distribution of scores on internal factors is shown in the Table 5.

This survey is the first step towards developing music learning media. Which through observation and interviews in this survey obtained Banwa data, various activities related

Table 5. Distribution of scores on internal factors.

	i.1	i.2	i.3
Total score	4512	2251	2243
Max	48	24	24
Min	33	16	16
Mean	40,29	20,10	20,03
Std. Dev.	4,10	2,59	2,20
%	80,57	80,39	80,11

to each indicator of this survey, in general, have been carried out by each respondent, both in the form of formal and non-formal activities. These activities have succeeded in increasing the knowledge and abilities of the respondents to develop materials towards forms of ICT-based learning media. Each respondent understands how to make learning media work, but has not been able to show it optimally. Based on the opinion of McAlpine and Weston [19], dan Levie and Lentz [20], it is necessary to study more deeply about the four important aspects in making and assessing learning media by optimizing their functions. The four important aspects referred to include, content, instructional design, learning media and communication, and user acceptance. While its functions include attentional, affective, cognitive, and compensatory functions.

4   Conclusion

Utilization of ICT facilities has an important role for music teachers in making learning materials. Which advances in computer hardware, and music composing software are utilized as an effort to present musical attributes into learning materials, so that in an auditive manner, the sounds of virtual instruments sound realistic. Likewise with the artificial intelligence features offered, it can make it easier for teachers to develop ideas for creating music.

Through this survey, the researchers found that types of computer hardware, music composing software, and social media platforms have been used by music teachers in the city of Bandung in a high category. Their activities make learning materials integrated in ICT in an open, active, and positive way. Among the different brands of hardware used, there is the same feasibility of using component specifications by following the developments and needs of the times. The components referred to include, processor, hard-disk capacity, and memory. Meanwhile, among the similarities in the types of music composing software used, there are different variations on the names of the applications from the developer companies. Likewise with the social media platforms used, there are different variations on the platforms used in online learning, both synchronously and asynchronously.

In terms of internal factors, researchers found that ICT facilities became an integral instrument for teachers in making learning materials. For indicators in this internal factor

scores are obtained in the high category. The indicators referred to include knowledge and skills in music composing software, pedagogical competence in the context of ICT-based teaching, and development of ICT-based teaching materials. So that it has a great opportunity towards developing music learning media that has a strong substance in the goals and orientation of 21st century music education. These findings are expected to be used as a basis for strengthening the competence of music teachers towards the future. Further studies can be directed at ICT developments specifically in the field of music.

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