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Designing Online Interactive Application of Learning Music Theory in Blended Learning Mode

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Abstract
Online teaching and learning technologies become widely advocated and employed in higher education, researcher attempt to comprehend the suitability of such technologies on student learning. This paper presents a research study that was conducted to design online interactive application of learning Music Theory in blended learning mode. This discussion focuses upon the appropriateness of selected content, instructional design and technical aspect that been incorporated into authoring software with interactivity option and admirable audio video support. A variety of media techniques including text, sound, pictures, video clips and animation were utilized to present the content of Music Theory lesson in an interactive and effective design. It enclosed three phases of development using ADDIE instructional design model that can embark on interactively to strengthen and test students’ self-learning. This study also involved the procedure of integrating the online interactive application of learning Music Theory with UPSI MyGuru2 system as a material for blended learning mode. The data was collected through a survey and feedback to bring forth students' perceptions and attitudes regarding the suitability of this learning aid. Results of the study showed that the developed application of Music Theory for blended learning courseware was suitable as a self-learning material and provided strong support to the understanding of concepts in the Music Theory.

Keywords: Multimedia, Application, Music Theory, Interactive, Blended Learning, Online Learning, Instructional Design.

Introduction
This article is an effort to describe and document methods for developing new interactive course material and creative educational online blended learning mode for Music Theory. It provides a
framework for designing and modularizing course content. With the advancement of technology and communication today, learning activities are no longer limited in a lecture room. In accordance with technology changes, teaching and learning approach also evolve in its own way which is more creative and innovative in term of the delivering knowledge. The using of appropriate technology and multimedia has given value-added and improve the interactive learning environment with the more effective learning process. Through this approach, students can access information or learning materials online at any time. "Blended learning" is suitable for use because of lacking in conventional learning. Mixed learning can improve potential and interest of students. Ministry of Education gives encouragement to use various learning strategies that can be utilized. Blended learning can be more effective and broaden the learning strategies. According to Harding (2010), blended learning is an approach that intervenes conventional face-to-face learning.

**Blended Learning in Music Education**

The terms online learning and e-learning or blended learning are frequently used interchangeably. Referring to Garrison (2011), e-learning embodies a “paradigm shift from the ideal of autonomy and the industrial production of prepackaged study materials characteristic of mainstream distance education. It represents a distinct educational branch with its roots in computer conferencing and collaborative constructivist approaches to learning” (p. 2). Likewise, Garrison has claimed, “blended learning integrates independence (asynchronous online communication) with interaction (connectivity) that overcomes time and space constraints in a way that emulates the values of higher education” (p.3).

Educators in Music Education program always strive to develop interactive multimedia educational software that can improve the students’ understanding in music with more interesting, efficient and effective manner (Nasrifan & Saidon, 2017). Blended and online learning approaches offer various chances to enable engagement and interaction, to deliver information, and to represent the concepts of music in different methods. This will assist to help students in their processes of connecting, deconstructing, and reconstructing knowledge in music education. Recent music learners need multiple cognitive opportunities to connect theory and practice by “engaging in attention, enactment, reflection, critique, adaptation, [and] articulation” (Laurillard, 2000, p. 136). The challenge is that numerous academicians in music education do not have the proficiency to transform their face-to-face courses into a program that facilitate students to gain knowledge of the content through interaction, engagement, collaboration, and critical thinking.

Most of the current meanings for blended courses point out that this approach to learning offers potential for improving the content delivery, social interaction, reflection, higher-order thinking and problem solving in higher education (Norberg et al., 2011). In addition, Dziuban and Moskal (2013) propose that “blended learning has become an evolving, responsive, and dynamic process that in many respects is organic, defying all attempts at universal definition” (p.4). For the purpose of designing of music course for blended learning mode, it can be defined as the purposeful combination of face-to-face and online learning involvements over the use of digital technologies (Figure 1).
In the field of music education, blended learning is mostly used in teaching and learning to give rich experience to both students and teachers. Teachers will have more opportunity to communicate with their students to fulfil the lacking knowledge by giving them online sources. After the class, the student can acquire efficiently by merging the information previously obtained in the classroom. This learning mode can be perceived as a model which permit students to learn theoretical knowledge by their own at home and practice what they have learned at school (Zownorega, 2013). Bergman and Sams (2012) added, blended learning allows students to learn the subject, which is supposed to be instructed in the classroom by the instructor, from the material recorded in electronic environment by the instructor and during out-of-class hours.

The use of new technologies in music education releases a broad set of possibilities, both strengthening present methodologies and permitting additional specific activities with respect to research, creation, transformation and classification of sound (Delalande, 2004). For teaching and learning music in blended learning mode, the educator plays the role of guide. The student is more active in comparison with face to face education. The other advantageous aspects of this model for music students are (i) students have the control of the online course material, (ii) students can discontinue the lesson each and every time they want, (iii) students be able to repeatedly endure the lesson within different timeframes and, (iv) students be able to deliberate in a more detailed manner and comprehend the topic better.

Lines (2005) outlined the main characteristics of blended learning for music education:

i. Students have the combination of the two approaches in learning where they be able to use the traditional mode of classroom teaching which allow them acquire personal interaction with instructor and their classmates; and can access the ICT supported teaching learning. This mainly be determined by the nature of the content and objectives being targeted for the music theory lesson. The course designer or lecturers will decide on the appropriate topic to be included.

ii. Educators are well competent with both the teaching and learning modes. It is crucial to have instructors that are very vibrant, techno savvy and fully trained to work efficiently traditional classroom setting and ICT assisted format.
iii. Students have literacy in using new technology. Nowadays all professions request proficiency in ICT so that blended learning can help them to exploit presented technologies to absorb benefit.

iv. Students acquire extensive experience with new perspectives of the course content delivery their content knowledge is enhanced and balanced. Blended approach in music learning provides multi dimension which offers student opportunity to communicate and share their opinions with the use of threaded discussion or forum session.

Designing and Development of Interactive Multimedia Application of Learning Music Theory in Blended Learning Mode

In designing multimedia application for music education, Sastre at. al (2013) stressed that:

“The teacher acts as a guide who facilitates learning and supports the students through their education. Technology is here a means of helping to explore our knowledge and is a very important tool for the search of information and the creation of activities. By incorporating these new technologies, we should move towards an approach centered on connectivity, and this means that the learning process has not only an individual dimension, but also a social one. Education implies learning communally and being able to contribute to the construction of knowledge. The teacher is a designer of learning spaces, and technologies play an intermediary role in the construction of knowledge and social interaction”. (p.3)

Designing and programming interactive multimedia project involve distinctive procedures, scheduling and techniques. The development Interactive Online Application of Music Theory for Blended Learning Mode, was steered by the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) instructional system design model (Ryder, 2012). It provides outline and reference to an instructional design project.

Multimedia Builder (MMB)

The online interactive course material design for Music Theory learning in blended learning mode is developed using an authoring tool called Multimedia Builder 4.9 (MMB). This authoring tool is used as it ability to organize all of the multimedia elements in line with learning theory, pedagogical approach, multimedia, interactive and interface principles. MMB offer an employed support for design and development procedures:

✓ MMB develop autorun menus, multimedia apps, games, or for online blended learning material without having to spend months learning complex programming languages.
✓ Create multimedia applications with graphic, text, sounds, Audio, Video, supporting CD Audio or Mixed-mode CD’s, executing applications and much more.
✓ MMB creates small stand-alone exe applications that can be merged with online learning platform (MyGuru).
✓ MMB has a modern interface with the useful features that you expect from high end graphics software, such as a multiple document interface, multiple Undo/Redo, selections, grouping, nested grouping, context sensitive menus, checking, distributing the files.
✓ Build interactive multimedia project by creating one or more pages. On each page you can combine text, buttons, graphics, hot spots, video and other actions into an interactive production.

![Multimedia Builder 4.9](image-url)

**Figure 2: Example of feature using Multimedia Builder 4.9**
Development process
The process is defined in the diagram below:

Phase 1 – Need Analysis and Planning
1. Recognize needs.
2. State objectives
3. Identify focus group
4. Determine the content

Phase 2: Multimedia Design and Development
1. Sorting musical concept
2. Present the musical concept.
3. Design activities
4. Create assessments
5. Multimedia elements and interactivity

Phase 3: Blended Learning Procedure
1. Integrating product into MyGuru

Phase 4 – Test
1. Test item development
2. Expert and student test

Figure 3: Sequence development of online interactive application of Learning Music Theory in blended learning mode

The four phases above are stretched in detailed below. Each segment is fragmented down into numerous components and each component lists guides the developer throughout the process.
Phase 1: Need Analysis
Phase 1 emphasizes on the educational needs of the learner. These learning outcomes are used to determine the content which direct us on identifying what students need to learn (learning objective) and then plan to incorporate the students’ expectations.

1. Recognize needs.
   ✓ Reason to build the interactive multimedia blended learning mode.
   ✓ The outcome
   ✓ The users

2. Determine learning outcomes.
   ✓ The students’ knowledge, understanding, or skills gain after using the interactive multimedia blended learning material.
   ✓ Strategy to allow students to utilize the material and how would this online material adequate into the teaching curriculum.

3. Determine the content
   The content determination of the needs that to be incorporated into the online interactive application of Learning Music Theory in this blended learning mode has been done by examining several sources from:
   ii. Course framework, Instructional design and syllabus of teaching and learning AMC1013 Theory of Music performed at the Faculty of Music and UPSI Presentation Arts
   iii. The content of teaching and learning music theory performed at the Music Department of IPG Campus Ilmu Khas, Kuala Lumpur
   iv. Modules for teaching and learning music theory in Distance Learning (PJJ) conducted at UPSI and OUM.

Phase 2: Multimedia design of the content development
In term of designing the content development into interactive multimedia mode, Sastre et. al (2013) stressed that:

“The fundamental idea in the incorporation of new technologies in music education is to make the most of work done during class time, taking previous experiences as a starting point to create new spaces that will ease the creative use of technology. It should be clear that technology must be integrated in practices done day by day by the teachers in their lessons. This integration must allow for exploration and experimentation with sound, and should not be an element that breaks with practices that are enriching for our students”. (p.3)

Phase 2 involve the process of recognizing a concept and presenting it for the learners in an attractive approach that supports them learn.

1. Identify musical concept.
   ✓ Music concepts that are essential, important, or common for students to understand.
   ✓ The communal misunderstandings for each of the concepts

Generally, future music educators are required to have adequate music skills and knowledge to prepare them to implement the Music Education Curriculum effectively. Consequently, the developer
has identified several topics that focus on the mastery of musical concept such as identifying type as well as the value of music note, interval, melody, triad, cord, cadence and rhythm. The foundation in music learning is the introduction to the theoretical and musical aspects that cover the notation and music language. It also involves drilling various rhythmic and melodic patterns in various tones, meters and note values. Mastery of the fundamentals of music theory is seen as the necessary skills and needs that can be achieved by providing effective and easy-to-use learning methods. Basic masterpiece of music theory should be applied at an early stage of learning so that its development is in line with the ability of the student to reach the required level of skill before graduation. Based on the justification and analysis of requirements that have been referred to through the various sources as mentioned above, the content units and musical concepts set for incorporation into the interactive instructional design for learning Music Theory in a blended learning mode is listed in the table below.

<table>
<thead>
<tr>
<th>UNIT</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT 1</td>
<td>Note</td>
</tr>
<tr>
<td>UNIT 2</td>
<td>Pic</td>
</tr>
<tr>
<td>UNIT 3</td>
<td>Chromatic sign</td>
</tr>
<tr>
<td>UNIT 4</td>
<td>Interval</td>
</tr>
<tr>
<td>UNIT 5</td>
<td>Triad</td>
</tr>
<tr>
<td>UNIT 6</td>
<td>Chord and Cadence</td>
</tr>
<tr>
<td>UNIT 7</td>
<td>Sight singing</td>
</tr>
</tbody>
</table>

Figure 4: Example of the front page for Unit 1
Present the musical concept.

✓ Present the musical concept using technology to create meaningful learning
✓ Identify the existence resources that explicitly address the educational challenge in presenting the musical concept in a similar design.

![Example of presenting the musical concept](image)

**Figure 5: Example of presenting the musical concept**

Design activities to engage and encourage the student.

✓ Present the knowledge with multimedia (graphic, text, animation, sound) to engage students’ interest.
✓ Using interactive example of the musical concept to assist students to relate with the context.
Create assessments to evaluate students’ knowledge.
✓ Identify the level of students’ understanding of the learned musical concept
✓ Evaluate the module effectiveness

Phase continues with defining the process from choosing the multimedia element to storyboarding designs.
a. Setting content and learning outcome
The content expert sets the student learning outcomes and learning goals for each units of the online interactive applications for learning music theory in the mixed learning mode. The content expert similarly supports to design the assessments section in order to certify students’ learning effectiveness.

Sub-topics have been formulated based on the identified key topics. For each sub-topic has been outlined specific learning outcomes that to be achieved by the end of the designed self-directed interactive multimedia learning courseware. The following tables show the distribution of topics, subtopics and the learning outcomes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Sub-topic</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Note</td>
<td>1. Note</td>
<td>1. Identify types of note and value</td>
</tr>
<tr>
<td></td>
<td>- semibreve</td>
<td>2. Application of types of note and value into activities</td>
</tr>
<tr>
<td></td>
<td>- minim</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- crochet</td>
<td>3. Rewrite rhythm</td>
</tr>
<tr>
<td></td>
<td>- quaver</td>
<td>4. Clapping beat</td>
</tr>
<tr>
<td></td>
<td>- semiquaver</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Not value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Rest sign</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Beat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Rhythm</td>
<td></td>
</tr>
<tr>
<td>Unit 2: Pic</td>
<td>1. Stave</td>
<td>1. Identifying pic on stave based on the clef</td>
</tr>
<tr>
<td></td>
<td>2. Bar</td>
<td>2. Naming the types of bar and the application</td>
</tr>
<tr>
<td></td>
<td>3. Clef</td>
<td>3. Identifying types of clef and function</td>
</tr>
<tr>
<td></td>
<td>4. Ledger line</td>
<td>4. Naming pic on ledger line</td>
</tr>
<tr>
<td></td>
<td>5. Meter</td>
<td>5. Identifying function and the concept of meter</td>
</tr>
<tr>
<td>Unit 3: Chromatic Sign</td>
<td>1. Chromatic sign</td>
<td>1. Naming the types of chromatic sign</td>
</tr>
<tr>
<td></td>
<td>2. Enharmonic note</td>
<td>2. Application of chromatic sign</td>
</tr>
<tr>
<td></td>
<td>3. Stem</td>
<td>3. Enharmonic notes and their function</td>
</tr>
<tr>
<td></td>
<td>4. Grouping note</td>
<td>4. Writing notes with the correct stem</td>
</tr>
<tr>
<td></td>
<td>5. Grouping rest</td>
<td>5. Identify the method of note grouping and rest</td>
</tr>
<tr>
<td>Unit 4: Interval</td>
<td>1. Major 2nd</td>
<td>1. Sing Major 2nd, Minor 3rd, Major 3rd, Perfect</td>
</tr>
<tr>
<td></td>
<td>5. Perfect 5th</td>
<td>3. Sing and rewrite two bars melody of conjunct diatonic scale</td>
</tr>
</tbody>
</table>
Unit 4: Triad
1. Major
2. Minor
3. Diminished
4. Augmented
1. Defining triad
2. Writing, the major and minor triads.
3. Writing, diminished and augmented triads.
4. Identify major and minor triad
5. Identify diminished and augmented triad

Unit 5: Chord
1. Chord I, IV and V in major scale major.
2. Chord i, iv and V in minor scale
3. Chord progression in major.
1. Identify chord I, IV and V in major scale.
2. Identify chord i, iv and V in minor scale.
3. Identify chord progression in major.
4. Identify chord progression in minor.

Unit 6: Cadence
1. Perfect cadence in major and minor.
2. Imperfect cadence in major and minor.
1. Identify perfect cadence in the key of major and minor.
2. Identify imperfect cadence in the key of major and minor.

Unit 7: Sight Singing
1. Concept of moveable and fix ‘do’
2. Sight singing - Rhythm
3. Sight singing - Melody
4. Tonic pitch
5. Scale
6. Interval
7. Solfege
1. Read and clap rhythm in simple and compound meter
2. Identify the tonic note of the played melody
3. Sing major and harmonic minor scale - ascending and descending
4. Identify the interval of the played notes
5. Sing using solfege for the melody in major and harmonic minor
6. Sight singing for the melodies given
Design Graphic
Graphic design involves artistic abilities in visual communication, visual design, and extensive knowledge of utilizing graphic editing software. The designer converts the abstract learning content into a visual language and layout that interconnects with the learning outcomes and learning goals. This development involves exactly of contravention with this formalist approach in favor of a creative and pragmatic approach (Elliot, 1995; Gardner, 1983; Green, 2002; Green, 2008) based on the exploit on the musical elements by creating, improvising and, above all, reinforcing collaborative creation in accordance with the current tendencies emerging from contemporary and informal education practices (Odena, 2005; Levy, 2007).

There are three main components that make up an interactive multimedia program effective and meaningful: (i) content, (ii) media and, (iii) interface layout.

1. Content
   ✓ Organize material using attractive style
   ✓ Shape content into evocative pieces of information. For instance, using bullet points
   ✓ Write concisely to ensure the message is clear
2. Media
✓ Determining the use of visuals elements to communicate the content (graphical language and visual communication)
✓ Determine color scheme for the slides or pages to be designed.
✓ Create images to support a visual representation of the text content.
✓ Construct animations and sounds that clarify the musical concept.
Interface navigation
✓ Determine the interactive interactions (button) to connect with each media (e.g., on mouse click, mouse over)

Phase 3: Blended Learning Procedure
Phase 3 involves the procedure of integrating the online interactive application of Learning Music Theory with MyGuru2 as a material for blended learning mode. A research by Sisco, Woodcock, and Eady (2015) discovered that students were mostly preferred by online e-teaching synchronous platform over those in face-to-face presentations, and the worth of online presentations was measured as good as face-to-face presentations. MyGuru2 is a platform for electronic learning (e-learning) that offers a range of tools and functions for the teaching and learning process. Generally, it allows lecturers to create and upload teaching and learning resources and publicize activities for students to achieve. At the same time, lecturers can also track and monitor learning progress for students.

MyGuru2 also acts as a portal where lecturers and students can give and receive latest news, forum communication and even chat. MyGuru2 is an e-learning platform that allows lecturers to create and upload learning resources and activities while allowing them to monitor student learning progress. It is a portal where students can achieve more than they should have learned from university, personal information, news and other resources that are integrated with the university. Generally, MyGuru2 consists of 4 different components: Subject Information, Assessment, Collaboration / Partnership Tools and Administrative Tools.

The course site in MyGuru2 allows users to access learning tools and information related to the courses that have been selected. Each course will contain its own site and the content is unique and specific between each course. The Course site is accessible to all users who are registered with the course but have the content displayed depending on accessibility. Registered students can access all the tools in the course, while unregistered students can only view the About Course section.

Figure 11: Merging course material of music theory with MyGuru2
“Course Material” link is one of the ways to upload learning materials in this MyGuru2 system. To add learning content, users need to click on the ADD button and enter the necessary information for the material. After the "Submit" button is pressed, the user needs to go back to "Menu" and interactive instructional materials in MyGuru2 for learning Music Theory in the blending learning mode can be accessed via the "Course Material" link as shown above.

**Phase 4: Test and Evaluate**

Phase 4 defines the inclusive parts addressed by surveys in the certain areas using a five point Likert rating scale for the indicated areas to measure attitudinal responses: Strongly Disagree, Disagree, Undecided, Agree and Strongly Agree. Course material testing included in the "Course Material" and "Lecture Note" links in MyGuru2 was made using a quantitative approach through a questionnaire. In this study, blended learning involves combining Internet and face-face physical co-presence of teacher and students. If properly implemented, it is a promising alternative learning approach compared to conventional face to face interaction. This test sees the perceptions of students and field experts on interactive online instructional designs for learning Music Theory in this blended learning mode from many aspects. Details of the course materials testing are divided into 3 parts:

1. Part A: Content instructional design interactive Music Theory
2. Part B: Instructional Design
3. Part C: Technical Requirements

Data collected will determine the usability and interface of the online interactive application of Learning Music Theory in MyGuru2 as a material for blended learning mode with regard to:

1. Is the material practical?
2. Are there some technical difficulties that hinder with the learning outcome?
3. Is the content easy to comprehend?
4. Does it carry the difficulty of the information?
5. Learning effectiveness and attitudes?
6. How did the material support the students learn?

The findings from this research study are highlighted with regard to student comments about how a blended learning approach and digital technologies could support self, peer, and teacher assessment practices and activities.

**Conclusion**

Further educational course online material for blended learning in music education can be developed to teach students in specific areas. These online material can link knowledge and expertise in term of interdisciplinary learning mode for current generation. Overall, the development of first-class interactive multimedia for blended learning needs designers to integrate finest knowledge in education and instructional technology to construct a beneficial and effective online blended learning setting for students. Nevertheless, Mohd Farhan (2006) stated that the effectiveness of a particular courseware not only depend on its contents, but also on its design and concept of the application’s development. Researchers can conclude that the development of Music Theory application for
blended learning has achieved the objectives whilst majority of respondents indicated positive feedback through each item proposed in the evaluation sheet.

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