

AUGMENTED REALITY AS COMPLEMENTARY TEACHING AIDS TO SUPPORT ONLINE LEARNING IN THE INTRODUCTION AND DEVELOPMENT OF INTERIOR MATERIALS COURSE

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Abstract

The Interior Design Department of Maranatha Christian University has successfully received funding from the Minister of Education and Culture and education to develop learning aids for Introduction and Development of Interior Materials. This course studies the characteristics of materials commonly used in interiors, so it is very important to use technology as a tool for delivery of material and props are delivered in various forms, both to be studied synchronously and asynchronously. Therefore, this program is developing a mobile Augmented Reality program to replace samples of physical materials as a learning aid in this course.

Keywords:

Augmented reality, e-learning, interior materials, props

Introduction

Interior Design Department, Faculty of Arts And Designs, Maranatha Christian University succeeded in receiving the grant for Introduction and Development of Interior Material course to develop learning aids to support the course's delivery content.

E-learning enables lecturers and students carry out the teaching and learning process from various different locations through internet access, the implementation can be carried out in a hybrid manner, namely synchronous and asynchronously so that students get material and learning processes that are not limited to lecture hours. Hence, Augmented Reality (AR) is a part of Virtual Reality (VR). AR provides an overview to the user about the merging of the real world with the virtual world seen from the same place. There are 3 characteristics of AR, namely interactive (increasing user interaction and perception with the real world), according to real time (real time) and in the form of 3 dimensions. (Manuri, F., & Sanna, A. (2016)

Augmented Reality models are being produced to aid learning process as a substitute of using real models..(Akçayır & Akçayır, 2017) Augmented Reality have an advatages as it could coombine Virtual objects or information overlaying physiscal objects or environment (Chen, 2017) In this manner students could have models with detailed explanation of the models compare to real modles which has to be explained verbally by lecturer, or in the form of two dimentional image.

The Interior Material Knowledge and Development course is a course which content is useful not only for students from interior study programs but also from other study programs whose scope of work can touch interior elements so that insight into interior materials is needed. Other study programs that can take advantage of this course are students from civil engineering, architecture, product / furniture design, visual communication design, fine arts, industrial engineering, etc. Content management of e-learning courses allows students from various programs get material and guidance according to their needs.

Course Learning Management And Course Content

Inroduction and Development Interior Material course is a course that teaches the types of materials used in interior elements. It's also trains students to learn to sle select and combines materials in an interior project assignments. Material knowledge for the interior is indispensable. This material can be part of architecture or added to cover the ceiling, walls and floor of a room (Ching, 2013). Each type of material has a different handling method, and a design that is suitable for using one material may not be suitable for other materials (Abercrombie, 2018). By understanding the

development of existing materials and how the material is applied, students will gain insight into consideration in making design decisions.

Likewise, the material for the Interior Material Knowledge and development course both asynchronous and synchronous material recordings, mid semester test and final semester test, also various supporting materials are uploaded on as special page for this course. Internet connection problem or meeting times for those located in different time zone are common problem regarding synchronous method. (Simarmata, 2018) Hence Augmented Reality models which could be downloaded into smartphones is one of solution which could replace real samples or models with advantages of adding information which could help student do their independent study.



Figure 1. Display of Knowledge Subjects and Development of Interior Materials
(source: personal documentation)

This course consists of 16 meetings including the Mid-Semester Examination (UTS) at the 8th meeting and the Final Semester Examination (UAS) at the 16th meeting. During the UTS and UAS, an online evaluation is also carried out regarding the implementation of the learning process, both related synchronous lecture implementation and asynchronous materials.

The Learning Outcomes of this Subject are:

1. Able to explain the origin of material use from its availability and its ability to answer the needs of the built environment conditions.
2. Able to identify and explain materials commonly used in interior design and building construction in principle.
3. Able to tell the role of material development in the history of interior design development.
4. Able to develop a material selection strategy in accordance with environmental sustainability considerations.
5. Students are able to combine materials according to their function and designation.



Figure 2. Video explanation of wood materials
(source: personal documentation)

Augmented Reality Application and Content Development

The program is developed by professional developer. Although there is a certain cost that have to be incurred, by using profesional developer their experience can minimize the problem arise in developing mobile application, since mobile appliaction needs to be able to work accross many types of smartphones.. Smartphone is being usedas most of the students has domesticate mobile phones in their lif.Mobile phones is integrated into daily life and adapted into daily practice. (Vanden Abeele, 2014)

The application (.apk) file could be downloaded from the Course Learning System (CLS) onto each mobile phone. When it is downloaded an icon will appear on the home screen of the mobile phone.If the icon is being click, then teh application will open and the user should scan a surface like a table, the the object will be "dropped" onto the table. The object is complement with description and when the diescription is highlighted a naration explains the description will appear.





Figure 3. The icon and initial appearance of the AR Material application
(source: personal documentation)

There are three content that is developed for Augmented Reality application which are :

1. Tree Structure and Cross Section, explain the parts of trees that is being used for Interior Design Material
2. The tree structure will show the anatomy of tree which wooden part is used in interior and furniture industry. The parts are consist of :
 - a. Base of the tree, usually don't have wooden knot and is ideal to be used for carpentry
 - b. Middle of the tree where the wooden knot, which are the beginning of tree branches. This parts is usually used for wood realated product such as paper, engineered wood, etc
 - c. Upper Part of the tree which consist of more branches usually is used for wood related Industry
 - d. Top part of the tree where smaller brnaches are located is usually used for firewood etc

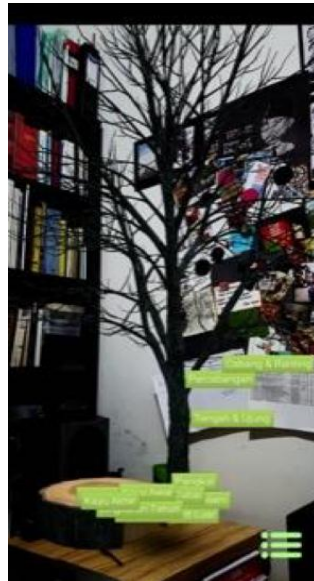


Figure 4. AR Tree Structure
(source: personal documentation)

3. Cross Section of the wood explain the parts of the tree which is being used for furniture or Interior materials , the parts consist of :
 - a. Heartwood, is the part that is used for furniture or Interior material
 - b. Sapwood, is a younger part of the ood and can not be used for furniture or interior material
 - c. Growth ring, is produced due different season and the growth rings is what gives the wood aesthetic pattern
 - d. Cambium, is the part of the tree which grow to inside and outer part
 - e. Bark, is the skin of the tree



Figure 4. AR Cross Section wooden
(source: personal documentation)

1. Stone Cycle, explain types of stone based on the formation process
 - a. Igneous Rock, are rocks resulted from volcanic eruption
 - b. Sedimentary Rock, are rocks that are being formed from layers of rock fragments or debris or other materials either organic or inorganic
 - c. Methamorphic Rock, is rock which going through methamorphic form because they are subjected to high heat, high pressure, etc
2. Material Life Cycle, explain the production process of a material from raw until the usage period, and whether it could be recycled or not
 - a. Resource, is the process of aquiring the material, whether it is being planted, mined st. wheter the process corresponding to regulations and pay attention to environmental impact
 - b. Processing, acquiring raw materials from living or non-living things must pay attention to the material and energy used. The process of obtaining and processing raw materials minimizes damage to the environment and uses energy effectively and efficiently
 - c. Manufacturing, processing of raw materials into semi-finished ingredients or finished materials needs to pay attention to processes that make the use of energy effective and efficient, and the management of waste or residual processing / waste must minimize damage to the environment.
 - d. Distribution, the distribution process takes into account the use of energy used, the farther the distance the more energy used. The efficiency of the size and the packaging system and the materials used for packing are of concern.
 - e. Installation, of the product minimizes the use of materials that have a negative impact on the environment
 - f. Use, there is a maintenance process that takes into account the impact on the environment and the health of the user, especially when using chemicals.
 - g. End of Life, can be the end of the useful life of the material and cannot be reused or can be recycled to the extent possible to reuse part or all of it and minimize waste.

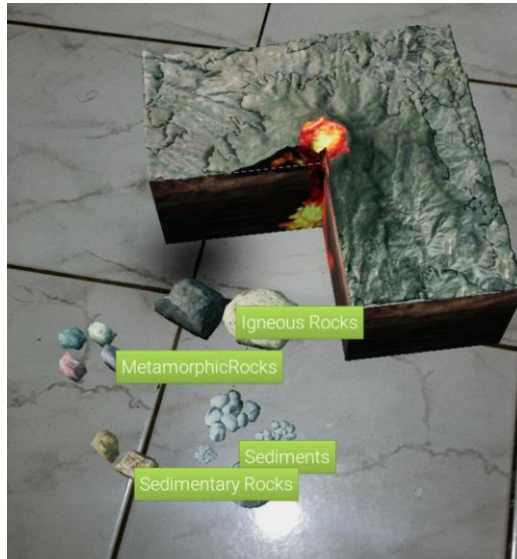


Figure 5. Stone Circle
(source: personal documentation)

Conclusion

Augmented reality in this subject of knowledge and material development makes it easier for students to study objects in three dimensions so that the need for a scenario-based learning process (Nakada et al., 2017) can be further developed, so that students can understand well the material for knowledge and development courses. material, and this course is not only enjoyed by Maranatha Christian University students but can be used for all Indonesian students who need it.

Teaching aids in digital learning need to be agile not only by developing materials in various forms but also by studying and developing various methods and applications so that students get optimal benefits from their diversity by sharing, being creative and collaborating and being strong students. by facilitating the development of soft skills such as presentation skills.

Thank You

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