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Instructional Media Integration Strategies for Basic Development of Human Capital: An approach to generate critical and creative minds in teaching and learning process

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Abstract

One of the main roles of education today is to improve and develop human capital by generating critical and creative minds among students. In this regard, characteristics of 21st century teaching and learning environment emphasize on learning and innovation skills which include creativity and innovation, critical thinking and problem solving, communication and collaboration which formed the basic needs for human capital development for students. The focus of the study is to designed the strategies in which potentiality of the instructional media are explored in supporting the teachers lesson to achieve the above requirements. Research has shown that instructional media which include the use of ICT can support new learning environments and instructional approaches. However, educators commonly agree that it has the potential to improve student learning outcomes and effectiveness if used properly (cf. Wang, 2001). Research literature also attests that teachers' pedagogies and pedagogical reasoning influence their use of ICT. In fact, there is extensive evidence of ICT contributing to pupils' attainment (Cox and Abbott, 2004)). Evidence shows that these benefits depend on the way in which the teacher selects and organizes resources, and how they are integrated into activities in the classroom and beyond. Thus, it requires teachers to have extensive pedagogical knowledge so that they can accommodate and integrate instructional media effectively in their teaching. This paper looks at some models of media integration in the TPCK Model: Technological Pedagogical Content Knowledge (Mishra, P., & Koehler, M.J. (2006) and the work of Jonathan Anderson (2003). Issues and implications of ICT-supported learning with regard to pedagogy in the teaching and learning process have been considered as well. Strategies for best practices among teachers in the classroom have also been developed and workshops have been conducted for groups of teachers in Malaysia. The strategies are designed in the form of worksheet known as Media Integration Analysis Worksheet (MIAW). Comprising 6 procedural aspects, namely, (i) types of media chosen, (ii) elements to be used, (iii) selected components of the element, (iv) skills and student profiles which includes thinking skills, multiple intelligences profiles, learning styles, moral values (v) Instructional tools which include the methods, techniques and activities; and (vi) Instructional questions. The worksheet guides teachers to integrate instructional media in their lesson plan fulfilling the necessary requirements in building up the basic human capital.

Keywords*: Instructional media, media integration, thinking tools, instructional tools, media integration analysis worksheet*

1.   Introduction

The development of educational technology is always related to the advancement of media usage and is concerned with creating conducive teaching & learning environment in the classroom. Since information and communication technology (ICT) came into the fore-front, there have been numerous innovations of hardware as well as software. However, education particularly in the field of educational technology not only refers to the tool but also as one of the main keys in generating critical and creative minds which can lead to improvements and development of human capital. Thus, one needs to design instructions systematically and orderly according the instructional design models to achieve the intended goal.

> Most people think of technology as simply a tool. Yes, technology is a tool, but the term "technology" is actually defined as applied knowledge. Educational technology is a field involved in applying a complex, integrated process to analyze and solve problems in human learning.
> *(AECT Definition and terminology committee, 1977)*

In this regard, learning and innovation skills including creativity and innovation, critical thinking and problem solving, communication and collaboration make-up the 21st century teaching and learning environment. Research has shown that the use of ICT can support new learning environments and instructional approaches. Moreover, educators commonly agree that ICT has the potential to improve student learning outcomes and effectiveness if it is used properly (cf. Wang, 2001). Research literature also attests that teachers' pedagogies and pedagogical reasoning influence their uses of ICT. In fact, there is extensive evidence of ICT contributing to pupils' attainment (Cox and Abbott, 2004)). However, evidence also shows that these benefits depend on the way in which the teacher selects and organizes ICT resources, and how it is integrated into activities in the classroom. Seen in this light…

> Teachers, as well as other educators, must have the knowledge and skills needed to integrate ICT effectively into the learning environment. If not, students will not be exposed to the wealth of information resources available and will be prevented from learning to use ICT effectively themselves.
> *(Building Capacity of Teachers/Facilitators in Technology-Pedagogy Integration for Improved Teaching and Learning Final Report Experts' Meeting on Teachers/Facilitators Training in Technology-Pedagogy Integration18-20 June 2003 . Bangkok, Thailand)*

Thus, it requires teachers to have extensive pedagogical knowledge so they can accommodate and integrate ICT effectively in their teaching. In short, education today needs teachers to develop and design their instructional planning involving 3 major areas; technology, pedagogy and content knowledge (TPACK).

Through history, media has been used by teachers extensively in the classroom. It ranges from projected material to non-projected material as well as new electronic media such as television video tapes & audio equipments referred to as audio visual aids (AVA). The evolution

of ICT has led to great changes in the development of AVA. The application of ICT transform data from analog to digital which starts from using software for composing texts, desktop publishing, audio and video creating and editing, computer-aided design, authoring and programming, and to a wide use of web-based learning. The term instructional media replaced the previous term although it has the same concept - that is, to enhance learning by better understanding through various categories of media according to the experience of the children as pointed by Edger Dale's Cone of Experience, 1961.

Literature has reviewed various terms used to define the usage of media /ICT in the classroom. The word application, adoption and integration are also widely used. The author uses the term integration to describe not only the usage of media but also the pedagogical aspect in line with some models of media integration in the classroom such as TPCK Model: Technological Pedagogical Content Knowledge (Mishra, P., & Koehler, M.J. 2006). and the work of Jonathan Anderson. Issues and implications of ICT-supported learning with regard to pedagogy in the teaching and learning process have been considered too. Strategies for best practices in the classroom have also been developed and workshops have been conducted for groups of teachers and lecturers in Malaysia.

The strategies are constructed in the form of worksheet known as Media Integration Analysis Worksheet (MIAW). It guides teachers to integrate ICT into the lesson planning. This worksheet comprises 6 procedural aspects namely, (i) types of media chosen, (ii) elements to be used, (iii) selected components of the element, (iv) skills and student profiles which includes thinking skills, multiple intelligences profiles, learning styles, moral values (v) Instructional tools which include the methods, techniques and activities; and (vi) Instructional questions.

2. Classification & Selection of Instructional Media

Media has been classified accordingly by its attributes which include printed & non printed material, projected & non projected materials, real object, 2D 3D objects, audio & video. The effective use of media in the classroom depends on the creativity and innovation, mode of delivery and instructional planning strategies. The selection of instructional media and activities are based on principles of instructional design model.

Thus, though the instructional media helps to foster students understanding of the content, it may not work effectively if the teacher treats media as a separate entity from the teaching and learning process. In fact it may become a burden to the teachers and as a result they may not use the media willingly in their lesson. Rushing to complete the syllabus, busy preparing student for examination are most common reasons and excuses given by teachers for not using instructional media in their lesson.

The varieties of media creation in the form of software & hardware as a result of world technological advancement give wide choices for teachers to select the most appropriate media to be used in their lessons. Due to their interactive features, most teachers prefer to use them for reasons that information is easily accessible because it acts as a "store house" and can be retrieved whenever needed. Thus, facebook, web-pages, blogs as well as e-learning become very popular. The concept of sharing & worldwide networking attracts the young to create and participate in learning activities. Teachers too use this platform to design instructions as such in order that they communicate effectively regardless of time and place.

3.   Integration of instruction media in the classroom

Integration of media in the classroom is one of the issues in the process of teaching and learning. Teachers are reluctant to use them in the classroom because they treat them as a separate entity. They only use to demonstrate certain processes in the experiment involved or to show video clips related to the topic.   However, the usage of the material is limited to the understanding of the topic only.

With the introduction of TPACK framework, (Content, Pedagogy & Technology) (Mishra, P., & Koehler, M.J. 2006), these three knowledge bases and their relationships is seen as very important. It is the interactions, between and among these components, playing out differently cross diverse contexts, that account for the wide variations seen in educational technology integration.

Figure 1:
The components of the TPACK framework (graphic from http://tpack.org).
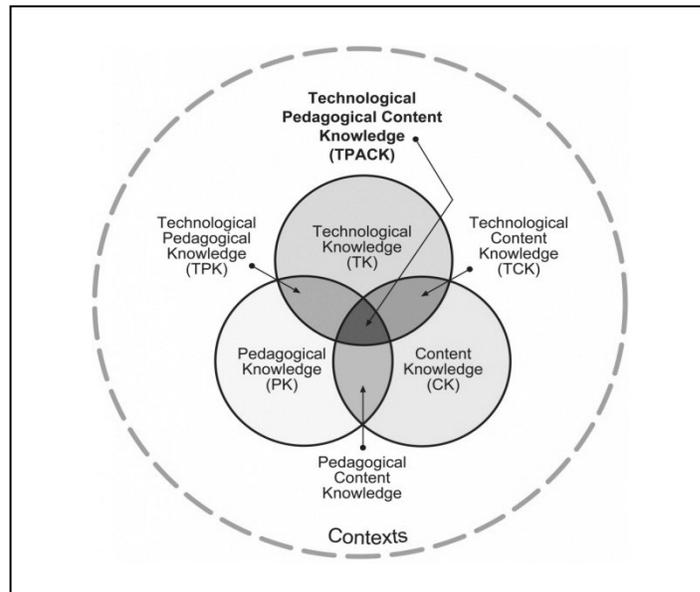
The diagram shows that teachers should equip themselves with all the skills in the 3 components. Anderson J, (2010) points out that there are four stages in the integrating of media in the classroom namely merging, applying, infusing and transforming. These four stages further explain the status of teachers activities of media usage in the classroom.

Table 1:
Matrix of ICT performance indicators for determining progress in ICT integration (Adapted from Anderson and van Weert, 2002)

Emerging	Applying	Infusing	Transforming
Teacher centered Didactic-style teaching	Factual knowledge-based learning Teacher centered Didactic-style teaching E-learning a separate subject	Learner-centered Collaborative learning	Critical thinking and informed decision making Whole-learner learning, multisensory, preferred learning styles Collaborative learning Collaborative knowledge

The four stages explain clearly the styles of teachers in delivering the lesson. In emerging and applying stages the teaching styles is teacher-centered which is not relevant in this decade. While the transforming stage involves critical thinking and informed decision making, whole-learner learning, multi-sensory, preferred learning styles, collaborative learning, collaborative knowledge which are more student centered and one of the features in the 21st century teaching and learning skills.

4.   Strategies For Media Integration

Considering all major issues & factors of media usage in the classroom, the author uses the term integration to describe not only the usage of media but also the pedagogical aspects in line with some models of media integration in the classroom. On this premise, strategies for best practices among teachers in the classroom are developed and workshops have been conducted for groups of teachers and lecturers in Malaysia.

The strategies are constructed in the form of worksheet known as Media Integration Analysis Worksheet (MIAW). It guides the teacher to integrate ICT in the lesson planning. It comprises 6 procedural aspects namely, (i) types of media chosen, (ii) elements to be used, (iii) selected components of the element, (iv) skills and student profiles which includes thinking skills, multiple intelligences profiles, learning styles, moral values (v) Instructional tools which include the methods, techniques and activities; and (vi) Instructional questions – instructions/questions/guides .

Table 2
Media Integration Analysis Worksheet (MIAW)

Types of Media	Media Elements	Components	Learning Skills/Students profiles	Teaching Tools (methods, techniques, activities)	Instructional Questions
Types of media chosen *(example: web/ social network/ graphic/LO audio/video*	Elements chosen: *(example:* **Graphic** *– building/ mountain range* **video clip** *–wildlife,* **audio** *– sound of the animals)*	Component chosen *(example: Graphic –* **Object/main object** *– building/seas* **Backgroud** *mountain ranges* **Emotion:** *feeling towards surrounding*	• *What are the suitable thinking tools to generate student's critical & creative minds (example cause & effect/ CAF, - from de Bono's work)* • *What type of Multiple Intelligences profile are to be used in relation to the student learning styles (example: Logical mathematical/musical etc.* What other 21st learning skills need to be integrated in the lesson. *(example: global awareness etc.* • *Moral values that need to be highlighted.*	• *Which teaching tools are suitable? (methods/techniques/activity)* • *Example : method* • *Cooperative learning/* • *Constructivism/etc*	• Teachers' preparation in the form of instructions/questions/guidelines based on the 5 columns in MIAW which enables teacher-student interaction in relation to the le sson.

5.   Media Integration Analysis Worksheet (MIAW)

The first column needs the teachers to identify the various types of media to be integrated in the classroom. This identification is based on the learning outcomes in relation to the subject content. This is the Content Knowledge (CK) in the TPACK domain.

Media chosen needs to be further analyzed according to its element such as text, graphic, audio, video & animation. This is the Technological Knowledge (TK) in the TPACK domain. However, knowing which elements to be used in the lesson is not sufficient in the process of media integration. Hence, we need to group the elements into components. Components can be created and categorized by teachers and they comprise various items for the purpose of generating critical and creative minds in the teacher-student interaction session.

Table 4
Component of media element

CATEGORIES	ITEMS
Object	Main object – building, common object – people, trees etc
Background	Anything appears behind the objects, mountain ranges etc.
Environment	Time, weather, color
Emotion	Feelings expressed – sad, happy
Significant	Economic, politics, cultural

After identifying the components, teachers need to plan their instruction considering the learning skills such as de Bono's thinking tools, students profiles which include Howard Gardner's multiple intelligences, learning styles, moral values and other features in the 21st century teaching and learning skills. The next column is to identify the suitable teaching tools to be used. Teaching tools compose of methods, techniques, and activities, (Newby, T.J. et al., 2000) represent the Pedagogical knowledge domain in TPACK. The teachers need to choose the appropriate teaching tools in relation to the first to third column in MIAW.

The last column deals with the instructional questions which guide teachers in conducting the lesson. This is the integration part (TPACK) – the integration of Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). Hence, the questions or guidelines constructed must be based on all information stated in all the 5 columns. Table 5 shows the example of MIAW for one selected English lesson.

Table 5
Example of Media Integration Analysis Worksheet (MIAW)

Types of Media	Media Elements	Components	Learning Skills/Students profiles	Teaching Tools (methods, techniques, activities)	Instructional Questions
Graphic: *Still photo (from Power point slide show)*	Elements chosen: **Graphic** – *(building/ mountain ranges)*	Component chosen *(example: graphic – **Object/main object** – (building/seas) **Backgroud** (mountain ranges) **Emotion:** (feeling towards surrounding)*	Thinking tools *cause & effect/ CAF, - from de Bono's work)* Multiple intelligences profile *Naturalistic /musical intelligence etc.* 21st learning skill*:* *global awareness – healthy leaving/environmental awareness* Moral values - *cleanliness*	*Cooperative learning/ Constructivism / exploration etc*	What are the buildings along the beaches for? Why do you say so? How is the weather? What are the evidences that support your answer? What are the people doing along the beaches? Where are they from? How did they come to the place?. What other facilities are found in this place to cater for the people's needs? How would you feel if you were at the beach.? (*more questions should be constructed in order to generate the critical and creative minds of the students*) Write an essay in not more that 100 words on "How I spent my holidays"

6.   Significance of the Media Integration Analysis Worksheet (MIAW)

Media Integration Analysis Worksheet (MIAW) is significant for teachers to identify the suitability of media usage during their lesson planning. It may used as part of instructional design process in media selection and as a framework for media integration in the lesson. It fulfills the 21st century teaching and learning requirements which recommended a combination of rigorous courses imparting both core content knowledge and skills to engage students and increase achievement. Within the context of core knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration whereby 3 domains in TPACK have been practiced in the MIAW . This is in line with our (Malaysia) National Philosophy of Education, which states:

> Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high levels of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large."
>
> *(Malaysia National Philosophy of Education, 1983)*

7.   Conclusion

In today's education teachers need to explore and exploit the potential of instructional media. The concept of media integration in the Media Integration Analysis Worksheet (MIAW) based on the 3 knowledge domains (TPACK) will foster student-centered teaching allowing for individual differences in learning styles to boost performance. In addition, the development of the instructional questions will not only generate critical and creative minds among students, but also promote the understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects.   The thinking tools used in the student-teacher interactions will further develop, communicate new ideas to others effectively and improve and maximize creative efforts towards innovations thus help to develop the basic human capital. Learning becomes more interesting, motivating, stimulating and meaningful.

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