

Bloom's Taxonomy with Digital Technology in Teaching and Learning Process

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Abstract

Before innovation of electronic teaching and learning facilities such as laptops, desktops, printers, television, tablets, power points and smartphones connected with internet teachers and students were using tradition method of learning. The innovation of these facilities brought a lot of changes. The majority of teachers yet don't cope with these changes hence they use tradition methods of teaching and learning tradition cognitive thinking orders terms. This paper aimed to remind teachers, lectures and tutors to use digital technological terms in developing cognitive ability to their students when they facilitate learning. The study reviewed the paper from educators' e Zine blog. In the findings the study showed digital technological terms that supposed to be used in: remembering, understanding, applying, analyzing, evaluating and creating. The study recommended that teachers, tutors and lecturers to use these terms when preparing their academic documents; provision of training to both pre-services and in-services training and all stakeholders should ensure that they provide digital technological facilities in learning institutions such as schools, college and universities. The study concluded that teachers, tutors and lecturers should accept these technological changes in cognitive thinking order unless these changes will change them.

Keywords: Bloom's Taxonomy, Digital Technology, Teaching, Learning, Process

Introduction

The great changes have been occurring from early of 1900's update in aspect of curriculum design, learning theories and pedagogical strategies (John & Srivasatava, 2024) the education system has been shifted from traditional learning method to modern formal of learning, due to innovation of new technology. The learning theories have been shifted from behaviorism theory to connectivism theory; the role of teachers changed from teaching to facilitating, from chalk talk approach to learners centered approach; learning facilities such as blackboard, chalks and books have been changed from traditional to sophisticated facilities such as e-books, e-contents, keyboards, mouse, printers, laptops, desktops, television, radio, drives, radio, CD ROM, smartphones. Furthermore the learning take place via various software application such as social platforms like wikis, Wikipedia, Facebook, YouTube video, mails, whatsapp, blogs, Google meet, and e-content. Due to given changes even cognitive learning objectives changed from traditional to reflect the digital technology

According to Charles (2021) in 1950's Benjamin Blooms developed the cognitive learning objectives from lower thinking skills to higher order learning skills based on nouns. He continued to argue that terminology; specific type, conventions, trends and sequences, classification and categories, criteria,

methodology, principles and generalization are used to identify the specific type of learning. Later Lorin Anderson Bloom’ students and Bloom’s partner David Reading Krathwohil challenged the Blooms Taxonomy as the based on the terminology, structures and emphasis. (Wilson, 2016). They changed from nouns as the important terms to verbs terms. Benjamin explained the cognitive thinking order from lower to high as knowledge, comprehensive, application, analysis, synthesis and evaluation unlike the Anderson & Krothwohil as they arranged from lower cognitive thinking order to higher cognitive thinking order as remembering, understanding, apply, evaluating and creating. Moreover in the level of knowledge the first three levels were identified in the original work, but rarely discussed or introduced when initially discussing uses for the taxonomy. Metacognition was added in the revised version. The level of knowledge in new version include: the first is called factual knowledge where the basic element must know to be required with a discipline or solve the problem. The second level of knowledge is conceptual knowledge in this level of knowledge the interrelationship among the basic elements within larger structures that enable them to function together. The third level of knowledge is procedural knowledge means how to do something , methods of inquiry and criteria for using skills, algorithms, techniques and methods and the fourth is metacognitive knowledge was knowledge of cognition in general as well as awareness and knowledge of one’s own cognition. From 2000’s the innovation of digital technologies have also great influence on these cognitive thinking orders. This academic paper aimed to examine the terminologies and structure of cognitive /thinking orders skills in sense of digital technologies

Objective of research: To study Bloom’s Taxonomy with digital technology in teaching and learning

Statement of the problems: Despite Bloom’s Taxonomy thinking order terms being used in learning and teaching process. The majority of teachers, tutors, lectures and students use Bloom’s Taxonomy thinking order terms in traditional ways they are not aware and unconscious to use them as digital technological Bloom’s Taxonomy thinking order terms. Is from this reason this academic paper aimed to study the Bloom’s Taxonomy with digital technology in teaching and learning process.

Research question: What are digital technological terms should be used from lower order thinking skills to high order thinking skills in teaching and learning process?

Research methodology: The study used systemic review method to obtain the information required by researcher. Information narrated in qualitative approach and researcher use table presentation of information so as to make readers to identify findings easily.

Findings and discussion

Table 1 showing the thinking order terms, traditional teaching and learning terms and digital technology teaching and learning term

VERBS	IMPOTRANT VERBS IN TRADITIONAL METHOD	IMPORTANT VERBS IN DIGITAL TECHNOLOGY
Remembering	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding	Bullet pointing, highlighting, bookmarking or favorite-ing-, social network, social bookmarking, searching or googling

understanding	Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying	Advanced and Boolean searching, blog journaling, twittering, categorizing, commenting and annotating, subscribing
Applying	Implementing, carrying out, using, executing	Running and operating, playing, uploading and sharing, hacking, editing
Analyzing	Comparing, organizing, deconstructing,, attributing, outlining, finding, structuring, integrating	Mashing, linking, reverse –engineering, cracking, validating, tagging,
Evaluating	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring	Blog/vlog commenting and reflecting, posting, moderating, collaborating and network, testing (alpha & beta)
Creating	Designing, constructing, planning, producing, inventing, devising, making	Programming, filming, animating, video casting, podcasting, mixing and remixing, Directing and producing, publishing, blogging and wiki-ing

According to table 1 showing the following:

Remembering

Remembering is the process of recognizing or recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definition of facts or list or to recite previously learned information. Consists these terms in tradition teaching and learning; recognizing, listing, describing, identifying, retrieving, naming, locating, finding while in digital technologies remembering of taxonomy offered the retrieval of material. This element is most crucial in knowledge development and information. The digital terms include:

Bullet pointing. This analogous to listing but in a digital format Highlighting. This is the key element of most productivity suites; encouraging; students to pick out and highlighting key words and phrases is a technique for recall Bookmarking or favorite-ing-. This is where the students mark for later use web sites, resources and files. Students can then organize these Social networking. This is where people develop networks of friends and associate. It forges and creates links between different people. Like social bookmarks and social network can form a key element of collaborating and networking Social bookmarking. This is an online version of local bookmarking or favorites, it is advanced because you can draw on others’ bookmarks tags. While higher order thinking skills like collaborating and sharing, can and do make use of these skills, this is its simplest form a simple list of sites saved to an online rather than locally to the machine Searching or Googling. Search engine are now key elements of student’s research. At its simplest the student is just entering a key word or phrase into basic entry pane of the search engine. This skill does not refine the search beyond the keyword or term

Understanding

Understanding is process of constructing meaning from different types of functions be they written or graphic messages or activities like interpreting , exemplifying, classifying, summarizing , inferring , comparing or explaining. Involves the following keywords in traditional methods Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying while in digital technology the following terms are used Advanced and Boolean Searching. In this point students require a greater depth of understanding to be able to create, modify and refine searches to suit their search needs

Blog Journaling. This is the simplest of the uses for a blog, where a student simply “talks” “write” or “type” a daily-or task- specific journal. This shows a basic understanding of the activity reported upon. The blog can be used to develop higher level thinking when used for discussion and collaboration. Twittering. The twitter site’s fundamental question is “what are you doing” this can be, in its most simplistic form, a one or two words answer, but when developed this is a tool that lends itself to developing understanding and potentiality starting collaboration. Categorizing. Digital classification, organizing and classifying files, web sites and materials using folders. Commenting and annotating. A variety of tools exist that allow the users to comment and annnonate on web pages, pdf files, and other documents. The user is developing understanding by simply commenting on the pages. This analogous with writing notes on hand outs, but is potentiality more powerfully as you can link and index these. Subscribing – subscription takes bookmarking in its various forms and simplistic reading one level further. The act of subscription by itself does not show or develop understanding but often the process of reading and revisiting the subscribed to feeds leads to greater understanding.

Applying

Applying is process of carrying out or using a procedure executing or implementing. Applying relates to or refers to situations where learned materials are used through products like models, presentations, interviews or simulation. In tradition forms it involves the following terms Implementing, carrying out, using, executing. While in digital technologies it involves the following terms Running and operating. This is the action of initiating a program or operating and manipulating hardware and applications to obtain a basic goal or objective. Playing. The increasing emergence of games as a mode of education leads to the inclusion of this terms in the list. Students who successfully play or operate a game is showing understanding of process and task application of skills. Uploading and sharing. Uploading materials to websites and sharing of materials via sites like flickers. This is form of collaboration, a higher order thinking skills. Hacking. Hacking in its simpler forms is set of rules to achieve a goal or objectives. Editing. With most media, editing is a process or procedure that the editor employs.

Analyzing

Analyzing is refers as the process of breaking materials or concepts into parts, determining how the parts relate to another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in function are differentiating, organizing, and attributing as well as being able to distinguish between the components or parts. When one is analyzing, he or she can illustrate this mental function by creating spreadsheets, survey, charts or diagrams or graphic representations. In tradition methods terms were Comparing, organizing, deconstructing,, attributing, outlining, finding, structuring, integrating while in digital technology the terms including:

Mashing. Mash ups are the integration of several data sources into a single resource. Mashing data currently is a complex process but as more options and sites evolve this will become an increasingly easy and accessible means of analysis. Linking. This is establishing and building links within and outsides of documents and webpages. Reverse –engineering. This is analogous with deconstruction. It is also related to cracking often without the negative implication associated with this. Cracking. Cracking requires the cracker to understand and operate the application or system being cracked, analyses its strengths and weaknesses and then exploit these. Validating. With wealth of information available to students combined with the lack of authentication of data, students of today and tomorrow must be able to validate the veracity of their information sources. To-do this they must be able to analyses the data sources and make judgments.

based on these Tagging. This is organizing, structuring and attributing online data, meta-tagging web pages, students need to be able understand and analyze the content of the pages to be able to tag it

Evaluating

Evaluation refers as the process of making judgment based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the process of evaluation. In the newer taxonomy, evaluating comes before creating as it is often a necessary part of the precursory behavior or before one creates something. In this stage including the following tradition terms Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring while in digital technology it involve Blog/vlog commenting and reflecting. Constructive criticism and reflective practice are often facilitated by use of blogs and video blog. Students commenting and replying to posting have to evaluate the materials in context and reply Moderating. This is high level evaluation. The moderator must able to evaluate a posting or comment from variety of perspectives, assessing its worth, values and appropriateness Collaborating and network. Collaboration is an increasing feature of education. In a world increasingly focused on communication, collaboration leading to collective intelligence is a key aspect. Effective collaboration involves evaluating the strength and abilities of participants and evaluating the contribution they make. Networking is a feature of collaboration, contacting and communicating with relevant person via a network association Testing (alpha and Beta). Testing application, processes and procedure is a key element in the development of any tool. To be an effective tester you must have the ability to process, what its correct function should be and what its current is.

Creating

Creating is process of putting elements together to form a coherent or functional whole; reorganizing elements into a new patterns or structure through generating, planning, or producing. Creating requires users to put parts together in a new way, or synthesize parts into something new and different creating the new form or product. This process is the most difficult mental function in new taxonomy. In this level of cognitive thinking order the tradition terminology involved: Designing, constructing, planning, producing, inventing, devising, making while in digital technology the terminologies to be used were Programming. Whether it is creating their own application, programming macros or developing games or multimedia applications within structured environment, students are routinely creating their own programs to suit their needs and goals Filming, animating, video casting, podcasting, mixing and remixing. These relate to increasing availability of multimedia and multimedia editing tools. Student frequently capture, create, mix and remix content to produce unique products.

Directing and producing. To directing or producing a product, performance or production is highly creative process. It requires the student to have vision, understand the components and meld these into a coherent product Publishing. Whether via the web or from computer, publishing in text, media or digital format is increasing. Again this requires huge overview of not only the content being published, but the process and product of video blogging. The production of video blog, blogging and also wiki-ing. Creating, adding to and modify content in wikis. Creating or building mash ups would also fit here

Recommendation

The study recommend that teachers, tutors and lectures, should be aware on the use this terms when they are teaching in the classroom, when preparing lesson plans, when preparing scheme of work, when filling the log books. In other hand policy makers should formulate policy which compatible with digital age.

Education administrators and others stakeholders should continue providing the digital education facilities such as computers, printers, television, radio, smart phone, projectors. Furthermore teachers professional development should be put into account for both in-services and pre-services teachers

Conclusion

The paper conclude that changes are inevitable if we resist changes those changes will change us. Teachers should change on teaching style and use digital technological terms in preparing their academic documents to reflect the digital era from lower cognitive thinking order to high cognitive order

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