



BLOOM'S TAXONOMY REVISITED IN THE CONTEXT OF ONLINE TOOLS

Milena Nikolić,
Tijana Dabić

University of Sinergija,
English Language and Literature
Department, Bijeljina,
The Republic of Srpska, B&H

Abstract:

The Bloom's taxonomy has turned sixty this year. Nevertheless, it seems it has never ceased to lose its educational value across various disciplines in spite of certain changes that occurred in 2001 when it was redefined by Anderson and Krathwohl. At the beginning of the 21st century, the need emerged for the Bloom's Taxonomy to adapt to the new ways of thinking and learning that appeared as a result of the ever-changing Digital World. The purpose of this paper is to give an overview of the Bloom's taxonomy and to present the Bloom's Digital Taxonomy Map by Andrew Churches via a case study of three tasks, performed by the use of online educational tools, in the course of applied linguistics and language teaching 2 at the Faculty of Philology, English Language Department and Literature at the University of Sinergija in Bijeljina. The presented can be useful for language professionals teaching English at all levels of education. The teachers can choose from the variety of tools depending on their students' language proficiency level and the technical possibility in the classroom.

Key words:

bloom's taxonomy, ELT, online tools, 21st century skills, tertiary education, applied linguistics.

1. INTRODUCTION

There has been a distinctive and growing need in our education for the engagement of higher order thinking skills from early childhood (Rajović, 2012) throughout the whole educational process (Collins, 2014). In this way, students not only acquire necessary knowledge and skills, but they also apply them to new situations. It is this kind of thinking that applies to life outside school where thinking is characterised by a series of transfer opportunities rather than as a series of recall assignments to be done (Brookhart, 2010). Besides the requirement of expanding the range of thinking skills at disposal, one has to bear in mind the fact that we live in the digital world and that we mostly teach the generations of digital natives (Prensky, 2010). As a result, there is a growing demand for both teachers and students to be digitally literate and fluent (Crockett, Jukes, & Churches, 2011). The state of being both (digitally literate and fluent) very often implies the use of various educational tools in teaching (Crockett, Jukes, & Churches, 2011; Dabić, 2014; Hart, 2015; Silaški, 2012). This paper is focused on presenting the teaching and learning environment created for the purpose of our course that tries to meet all the requirements regarding the employment of higher-order thinking skills and digital literacies and fluencies. Our main focus is the deployment of Bloom's

Correspondence:

Milena Nikolić

e-mail:

mnikolic@sinergija.edu.ba



Taxonomy Map (Churches, 2007) and online educational tools (Popplet, Facebook, Voicethread, Google Search and Trello). In order to achieve the above-stated, the students were assigned three tasks within the course entitled Applied Linguistics and Language Teaching II¹ at the Faculty of Philology, English Language and Literature Department at the University of Sinergija in Bijeljina, where they demonstrated the use of all six levels of thinking (traditional and digital aspect included) via online educational tools.

2. THE OVERVIEW OF BLOOM'S TAXONOMY EVOLUTION

In 1956, Benjamin Bloom developed his taxonomy of educational objectives that has become the key tool in structuring and understanding the learning process which fitted into one of three psychological domains (cognitive, affective and psychomotor). The psychomotor domain refers to manipulative, manual or physical skills, the affective domain includes attitudes and feelings whereas cognitive domain encompasses processing information, knowledge and mental skills. The cognitive domain as the one in which most of the work in the curriculum development has taken place includes the objectives which deal with the recognition of knowledge and development of intellectual abilities and skills. According to the taxonomy defined in the handbook entitled *Taxonomy of Educational Objectives* edited by B.S. Bloom, there are six thinking skills on the scale from lower to higher hierarchical order: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956: 18). We will provide a brief summary of six thinking skills in chronological order suggested by the Bloom's Taxonomy (see Figure 1 for verb list in each subcategory).

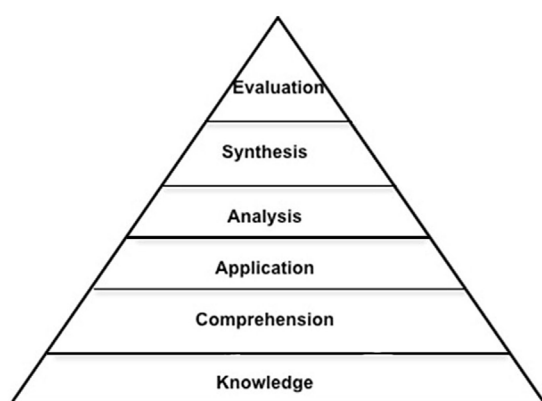


Figure 1.

¹ Due to the limited paper length, the tasks performed throughout the course of Didactics aimed at using new online educational tools are not going to be described here. However, the results bear a striking similarity to those presented and discussed in this paper.

1. Knowledge, as the lowest order thinking skill, is defined as the ability to recall previously learned material (specifics and universals, methods and processes, a pattern, structure, or setting). The psychological processes of remembering are stressed. The process of relating is also involved in the knowledge test. It requires the organization and reorganization of a problem, i.e. finding the appropriate signals, cues and clues that will activate whatever knowledge is filled or stored.
2. Comprehension represents the lowest level of understanding. It is the ability to grasp the meaning, explain and restate ideas by means of translation and interpretation. An individual knows what is being communicated and can use the idea communicated without relating it to the other material.
3. Application is the ability to use the abstractions (learned material) in new situations. The abstractions may take form of general ideas, rules of procedures, generalized methods and technical principles.
4. Analysis is the ability to separate material into component parts and show relationships between parts. This is useful for clarifying the communication and indicating how it is organised. There are analyses of elements, relationships and analysis of organizational principles.
5. Synthesis is the ability to put together the separate idea to form a new whole. It is the process of working with pieces, parts and elements and arranging them in a way as to constitute a structure or pattern.
6. Evaluation is the highest order thinking skill defined as the ability to judge the worth material against the stated criteria, quantitative and qualitative judgments about the extent to which material satisfy criteria. There are judgments in terms of internal criteria (those determined by the student) and external one (criteria given to him or her).

At the turn of the 21st century, the Bloom's Taxonomy was slightly revised by Bloom's former student L. W. Anderson and D. R. Krathwohl.² Unlike Bloom's original taxonomy where each category is described as a noun (the categories being arranged in increasing order, from lower order to higher order), Bloom's Revised Taxonomy from 2001 uses verbs rather than nouns for each of the categories (see Figure 2).

The first thinking skill (Knowledge) is now called Remembering (the process of retrieving, recalling and recognizing knowledge from memory). Comprehension is substituted for Understanding, i.e. the process of constructing meaning from different types of function (written and

² For detailed analysis see Anderson & Krathwohl, 2001.



graphic). Application becomes applying, *i.e.* carrying out or using a procedure through its executing or implementing. Analysis turns into Analyzing, *i.e.* breaking the concept into parts, determining how the parts relate to one another or to the overall structure.

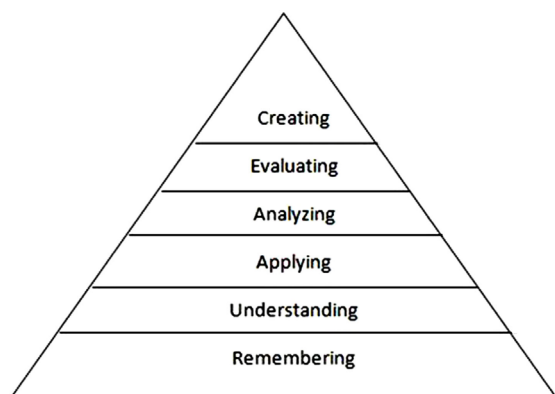


Figure 2. Bloom's Revisited Taxonomy
(L. W. Anderson and D. R. Krathwohl)

There is also a rearrangement of the sequence within the taxonomy. The most striking changes are made to the last two higher order thinking skills (Evaluating and Creating being the revised positions in Bloom's Revised Taxonomy). That is to say, the highest order thinking skill in the Bloom's Taxonomy (Evaluation) is now at the fifth place and is entitled Evaluating (making judgments based on criteria and standards through checking and critiquing), whereas the fifth one (Synthesis) is exalted to the highest place in Anderson and Krathwohl's taxonomy and is entitled Creating (putting the elements together to form a coherent or functional whole).

3. BLOOM'S TAXONOMY IN DIGITAL CONTEXT

Even though Bloom's original taxonomy and revisited taxonomy by Anderson and Krathwohl are the key tools for teachers since they are providing actions and learning opportunities emerging as technology advances, they do not address new processes and objectives that appear as the result of technological advancement and integration of ICT into the everyday life of a student. Thus, the need for dealing with this deficit gave rise to Bloom's Digital Taxonomy. It refers to both the cognitive domain and methods and tooling. In 2008, Andrew Churches devised a model for Bloom's Taxonomy for the emergence of digital tools that are often used integrated into classrooms and deployed by students. The verbs belonging to each category are presented on two levels: traditional and *digital*:

1. Remembering, recognising, listing, describing, identifying, retrieving, naming, locating, finding/ bullet pointing, highlighting, bookmarking, social networking, social bookmarking, favouriting/local bookmarking, searching/googling;
2. Understanding: interpreting, summarising, inferring, paraphrasing, classifying, comparing, explaining, exemplifying/ advanced and Boolean searches, blog journaling, twittering, categorizing and tagging, commenting, annotating, subscribing;
3. Applying: carrying out, using, executing, implementing, showing, exhibiting/ running, loading, playing, operating, hacking, uploading, sharing, editing;
4. Analysing: comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating /mashing, linking, validating, reverse engineering, cracking, media clipping;
5. Evaluating: checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring /blog commenting, reviewing, posting, moderating, collaboration, networking, refactoring, testing;
6. Creating: designing, constructing, planning, producing, inventing, devising, making/ programming, filming, animating, blogging, video blogging, mixing, re-mixing, wiki-ing, directing, broadcasting.

In this model, the elements coloured in black are already existing verbs, while the elements coloured in blue are new digital verbs.³

However, digital verbs are used in digital environment very frequently with the use of various educational online tools. The first Digital Bloom's Taxonomy Pyramid was first published in 2007 by Samantha Penney (Roberts, 2012). There are two problems that can arouse in this context. First, this kind of classification implies distribution of tools according to the appropriate level of their use. However, a great number of those tools can be used for various purposes, *i.e.* one tool can be used to engage different levels of thinking. The second problem is the popularity of the tools, *i.e.* a new list of educational online tools is published annually.⁴ (see Hart, 2015)

4. APPLICATION OF BLOOM'S DIGITAL TAXONOMY MAP AND ONLINE TOOLS: A CASE STUDY

After providing the theoretical framework for Bloom's Taxonomy in digital context, in this section we will discuss the effects and benefits of its implementation in the course of Applied Linguistics and Language Teaching II during the

³ For detailed explanation of all new digital verbs see Churches, 2007.

⁴ <http://c4lpt.co.uk/directory/top-100-tools/>



academic year 2015/2016. As a part of the course, a model for earning extra points after the completion of each chapter/topic was developed. Students were assigned a task to be performed with the use of the specified online tool that was to be mailed to the professor for the assessment within the five-day time period. During that time they were free to contact the professor via e-mail or Facebook for any further questions or clarification. The special group on Facebook had previously been created for teaching purposes. The purpose of the tasks assigned to students was to give them the opportunity to activate higher levels of thinking, to learn to navigate in the digital world and to individually and collaboratively apply theoretical knowledge in practice and in digital world. In this paper, the students' performance for three tasks will be presented.

For each task, the organization of students' tasks along with the employment of Bloom's Digital Taxonomy verbs and online tools will be provided. First, the chapter and the task related to the chapter in the textbook as well as the online tools used to perform these tasks will be stated. Second, the usage of traditional and digital verbs in Bloom's Taxonomy (Churches, 2007) that correspond to the tasks performed will be exemplified.

The tasks were chosen from three chapters from the course textbook: Discourse Analysis, Pragmatics and Corpus Analysis.

Discourse Analysis: Task I

Task: Provide a visual presentation of the features of spoken (formal/informal) and written (formal/informal) discourses.

Online tools: Popplet, Facebook, Trello

Traditional verbs usage:

- C: planning, designing
- E: experimenting
- A: comparing, organizing,
- A: showing, exhibiting,
- U: summarizing, classifying, exemplifying, comparing, exemplifying,
- R: listing, describing,

Digital verbs:

- E: posting, moderating, validating
- A: mashing, linking
- A: running and operating, uploading and sharing, hacking
- U: categorizing & tagging, subscribing
- R: searching, googling, bullet-pointing, social networking

After completing the chapter on Discourse Analysis, the students had to provide a visual presentation of key features of the following four categories: informal spoken discourse, formal spoken discourse, informal written discourse and

formal written discourse with or without provided examples of discourses. The online tool they were requested to use for this purpose was Popplet (www.popplet.com) (Fraizer, 2015). Popplet is a free, collaborative web tool that allows you to organize interactive multimedia graphics. It is an excellent tool to create mind-maps and diagrams. After they had completed the task, they were supposed to send it via e-mail for assessment. Having satisfied the requested criteria, they were approved to upload it on Trello board Applied Linguistics and Language Teaching II in the card Discourse Analysis. Trello is a project management or a task management tool that works with cards and columns. This organizational principle provides a visual representation of tasks. The columns can be freely defined, and the cards can be moved around or re-ordered (www.trello.com) (Lytle, 2012).

As we can see, the students had to employ the verbs at all levels of the taxonomy. They had to make a list of all the features in order to describe various discourses they had provided as examples. Afterwards, they had to summarize the features and distribute them to four categories at the same time comparing the categories and exemplifying. Having completed this stage of the task, they were inclined to find the way how to show/exhibit these categories in Popplets. During the process of Popplet creation they were expected to compare the categories and think of the ways of organizing them in accordance with the conclusions they had drawn. While doing this they were experimenting with the online tool. Finally, they made a plan how to design their Popplet.

In digital context, in order to find various presentations of different extracts and samples describing various discourses, they had to do some searching/googling. The students used social networking in order to communicate with their colleagues as they have a Facebook group created for this purpose (Munoz & Towner, 2009). In order to use the online tools (Popplet and Trello), they had to subscribe. Along with learning how to use these new applications, they also had to run, operate and hack the tools, upload their work and share it. In the Popplet creation they had to do some mashing and linking. After posting their work, it was validated by the teacher and moderated by the rest of the class.

Pragmatics Task II

Task: Analyze and comment on the dialogue the professor uploaded on VoiceThread.

Online tools: VoiceThread

Traditional verbs:

- C: producing, inventing
- E: hypothesizing, judging, detecting
- A: deconstructing, attributing
- A: carrying out, showing, using



U: interpreting, explaining, exemplifying, inferring
R: finding, describing

Digital verbs:

C: videocasting
E: monitoring, commenting, posting, collaborating
A: mashing, tagging, validating
A: uploading, sharing, editing, annotate
U: categorizing & tagging, subscribing, commenting
R: searching, googling, social networking

After completing the chapter Pragmatics, the dialogue Silly Job Interview by Monthly Pythons⁵ was uploaded on VoiceThread (www.voicethread.com) (Rodesiler, 2010). VoiceThread is a totally web-based application that allows you to place collections of media such as images, videos, documents, and presentations at the center of an asynchronous conversation. The application enables students to post their comments in five different ways: as a text comment, an audio comment, a video comment, an uploaded comment and a comment left via phone.

In this process they used all six levels of thinking in the taxonomy. They had to find and describe the dialogue. On a higher level they had to interpret and explain the dialogue, carry out an analysis and choose the way to show their opinion. They had to deconstruct the dialogue to its main segments and attribute the features to its participants and argument their illocutionary force. In doing that, they had to detect references, hypothesize the participants' intentions and judge their behaviors. All their comments were visible to other students, so they often challenged the opinions of the colleagues and elicited a kind of discussion. In the end, they 'invented'/produced something completely new as a result of their collaborative work.

In the digital context, they had to follow the link and enter the VoiceThread. They used Facebook group for any misunderstandings or questions they had. In order to be members, they had to subscribe so that their comments can be tagged. In this meshing process they were uploading, sharing, annotating and commenting. Furthermore, they were collaborating, monitoring each other's work and posting their comments. The final result was videocasting the final product.

Corpus Linguistics: Task III

Task: British National Corpus Search (KWIC) and the analysis of the hits.

Online tools: Google Search

Traditional verbs:

C: Planning, Producing
E: Testing, Detecting
A: Comparing, Attributing
A: Carrying out, Using, Showing,

U: Interpreting, Inferring, Classifying, Explaining, Comparing, Exemplifying

R: Listing, Finding,

Digital verbs

C: publish
E: commenting, detecting
A: validating
A: categorizing, commenting, hacking
U: advanced searching

After completing the chapter Corpus Analysis, the task set to students was to carry out an analysis of whichever word they chose from the British National Corpus⁶. More specifically, they had to mark the type of analysis as KWIC and choose the context for the word (spoken, written, meetings, letter *etc.*). They were provided with a list of key words in various contexts with specific number of hits. They were expected to analyze the word from grammatical and semantic/lexical aspect. They used the online tool Google Search to perform this task. Upon the assessment, they uploaded it on Trello.

The students used the first two levels by finding the website and understanding how to use it. Afterwards, they carried out the search and tested the software. In this process, they had to compare the words in different contexts and to detect typical and exceptional cases. In the end, they had to plan the manner of presenting the collected data and 'produce' a unique piece of work with their own hallmark.

In digital context, they used the verbs from four levels. They used advanced searching because they had to navigate the search to find the page where they can type the word and conduct the analysis. They had to hack the software in order to know how to use it. They categorized the keywords according to the words that were in its vicinity and commented on the search results. They had to consult the theory in order to detect the existing patterns and comment on them. In the end, they published their result and posted it on Trello.

5. CONCLUSION

An urgent need for exploration of Bloom's taxonomy in digital context has emerged from the fact that both, the original Bloom's taxonomy and the one revisited by Anderson and Krathwohl, were not able to address new processes and objectives that appeared as the result of technological advancement and integration of ICT into the everyday student's life. We presented the Bloom's Digital Taxonomy Map by Andrew Churches via a case study of three tasks, performed by the use of online educational tools within the courses conducted at the Faculty of Philology, University of Sinergija. We showed that the students' performance of these tasks

5 <https://www.youtube.com/watch?v=zP0sqRMzkwo>

6 <http://www.natcorp.ox.ac.uk/>



proved to be efficient and effective, since it enabled them to activate higher levels of thinking, learn to navigate in the digital world and individually and collaboratively apply theoretical knowledge both in practice and digital world. Furthermore, the application of this method brought the following benefits to the teaching and learning process within this course: (1) the homework concept in the students' digital environment is being set; (2) the collaboration among students via the Facebook group is being provided; (3) the students' creativity and freedom to choose the manner in which their tasks are going to be presented via online tools is being exercised; (4) a greater level of engagement and devotion is being displayed by students due to their awareness of the fact that their work would be in the public eye and (5) students' literacies and fluencies are being developed in this manner. The overall process just opened the door to new ways of teaching and learning at the Faculty of Philology in Bijeljina and generated the implementation of many innovative ideas in the upcoming time.

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