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## **PEDAGOGICAL THEORIES IN ONLINE EDUCATION: TEACHING IMPLICATIONS FOR ONLINE COURSES**

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## **ПЕДАГОГИЧЕСКИЕ ТЕОРИИ В ОНЛАЙН-ОБРАЗОВАНИИ: ИХ ЗНАЧИМОСТЬ ПРИ РАЗРАБОТКЕ ОНЛАЙН-КУРСОВ**

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*Abstract.* As online courses have a pivotal and growing role in the educational curriculum at the present moment, the purpose of the given article is to review the current directions in schools of thought and establish pedagogical applications to be directly applied in course design. Key components of online courses, namely, course and module objectives, instructional materials, the specificity of tasks and assignments are being thoroughly discussed about the theoretical foundations of online education including behaviorism, cognitive, constructive, and connectivist approaches. The entire body of theoretical underpinnings is illustrated with successive teaching samples personally devised for the online course to promote a better understanding of the discussed concepts and supplied with pragmatic recommendations for novice instructors of online courses.

*Аннотация.* Поскольку в настоящее время онлайн-курсы играют ключевую и прогрессирующую роль в образовательной программе, целью данной статьи является обзор текущих направлений в онлайн образовании и установление педагогических технологий, которые будут непосредственно применяться при разработке курсов. Ключевые компоненты онлайн-курсов, а именно это цели и задачи как курса, так и модулей, учебные материалы, специфика задач и заданий для студентов, подробно обсуждаются с учетом теоретических основ онлайн-образования, включая бихевиористский, когнитивный, конструктивный и коннективистские подходы. Совокупность теоретических основ проиллюстрирована последовательными примерами обучения из персонального онлайн-курса, чтобы способствовать лучшему пониманию обсуждаемых концепций, и снабжена практическими рекомендациями для начинающих инструкторов онлайн-курсов.

*Keywords:* online course, theory of behaviorism, cognitive approach, constructivist approach, connectivism, online instruction, digital tools.

*Ключевые слова:* онлайн-курс, теория бихевиоризма, когнитивный подход, конструктивный подход, коннективизм, онлайн-обучение, цифровые инструменты.

Despite the considerable growth and development of online education, course designers are still tasked to “maximize user satisfaction and encourage learning outcomes in a format that is different from traditional education” [1, p. 157]. The current article presents a modest attempt to outline “starting points” and introduce the fundamentals for online course design and delivery. To better dive into the discussion of knowledge acquisition in the online mode and its specificity, there

is a need to mention schools of thought that underlie online learning instruction and practices. To be more precise, there are four of them: behaviorism, cognitivism, constructionism, and the most recent development — connectivism.

The behaviorism approach in pedagogy is notable as it was an initial attempt to explain learning processes, in particular, language acquisition. The behaviorism movement was founded by the most outspoken researcher B.F. Skinner in the USA. He advanced a theory that knowledge is displayed through the behavior of learners in a response to a certain “stimulus” [2, p. 213]. Three pillars of behaviorism entail imitation of the desired behavior, monitored practice, and positive/negative reinforcement or encouragement. Behaviorist supporters take into consideration only what is overt, observable, and could be measured easily in terms of quantitative research. The most notable limitation of this theoretical framework that attempts to explain knowledge acquisition is that it completely neglects the functions of the brain and its cognitive processes such as memory work and its capacity, information processing and knowledge structures, perception, and meta-skills (Rotfield, 2007; Clark, 2018; Bargh & Ferguson, 2000). B.F. Skinner, however, later concluded that covert processes in the brain which are normally untraceable produce the same changes in the behavior of individuals in response to the stimulus [2, p. 213]. Over time, as a response to behaviorist limitations, a cognitive approach to learning has been developed.

Another well-known approach in online learning is considered to be the cognitive perspective. Cognitivist researchers made an attempt to look into the ways how learners think, namely, the description of processes such as perception, reflection, categorization, and abstraction. From this point of view, for learning to happen, information must undergo certain stages. As research revealed, the input should be perceived by senses and placed into a sensory store or loop for a very limited period, less than one second; notably, information must be processed immediately and sent to working memory, otherwise, it will be erased. The force of attention directed towards new information has a major role to play; the more attention coming element receives, the sooner it is transferred to the short-term memory. Another defining factor is the ability of a learner to make a sense of the input. The existence of cognitive structures assists learners to create links between background knowledge and newly learned information. It is easier to retain information if it is related to what learners already know. Again, it appears necessary to foreground that the capacity of short-term memory is quite limited, it equals one-third of a minute, consecutively, provided that information is not processed — it will not be moved to long-term memory. It is evident that timing has a considerable impact on learning; moreover, the quality of processing in short-term memory directly results in the amount of information successfully transferred to long-term memory [6, p. 22]. Pedagogical implications of the cognitive processes are discussed in the practical section of this article.

In addition to cognitivism, there is a constructivist philosophy to serve for online knowledge acquisition. The constructivist approach proposes to view learners as active and central agents of the teaching-learning process, they are “takers” of knowledge. The knowledge is constructed through contextual learning and the emphasis is placed on the ability of students to interact with the surrounding environment to take in knowledge bits after active exploration. Interaction has a multi-modal orientation (Anderson, 2008; Jaleel and Verghis, 2015; Moreno and al., 2000; Badie, 2015) that is learners are encouraged to engage in the following modes - interaction with the interface of the online platform, content interaction, learner-to-course instructor interaction, or learner-to-learner communication in collaborative and cooperative tasks and activities [6, p. 33]. Learner-context interaction could be seen as a final stage of discovery-based learning, in which learners are expected to personalize knowledge and apply it to real-life contexts. Contrastingly, as students are given to

maintain a considerable amount of freedom there is a misleading interpretation of the constructivist theory, because of the widespread opinion that this philosophy allows students to float around in the pond of fledgling topical information unless they acquire it by themselves. Contrarily, learners are supposed to have a leading position in class who will always take initiative and gradually shape and transform their learning through guided discovery [10, p. 110]. Instructor support is a key element of this pedagogy. According to C. Vrasidas, teachers should equip their students with suitable materials and tasks while providing substantial scaffolding in response to the need of students so that they can achieve progress and keep up with the flow of the course [11, p. 9].

The last and the most recently evolving paradigm in online education is the theory of connectivism. This pedagogical approach has been formed in response to the current pervasive influence of globalization and the spread of technology that unites learners, teachers, experts all over the world in the online space of the Internet (Anderson, 2008; Duke and al, 2013; Downes, 2008). Connectivism supporters claim that available online learning content has acquired a dynamic nature since it is accessed by many users who in turn adapt, add, revise and upgrade the current state of knowledge that could be found online. With universal access and the opportunity of spreading information, the digital space has created an obvious but poorly controlled dichotomy between invaluable high-quality informational resources and distorted, inaccurate, or unreliable materials that are equally accessible to users. In addition, both valid and poor resources are scattered along the continuum of the online network; this condition complicates the process of filtering information which requires certain searching media-literacy skills and a considerable amount of time. Obviously, in light of fast-evolving changes, learners are exposed to abundant informational resources; this might have possible negative effects unless the learner does not have the necessary set of skills how to select, process, learn, and if necessary, unlearn previous information to create mental space to allow new information to sink in. It could lead to intellectual challenges for potential learners as they have first to learn how to recognize and select valid sources, second, they also need to develop a sense for differentiation of important from not important information before the actual learning occurs. A salient point to be considered for learners would be the necessity to connect to the scientific community to be well-informed of the constant changes in the field of their interest. In connectivism, autonomous and self-directed learning is endorsed as this approach assists students to continually “upgrade” their education and to be life-long learners.

Now as we elaborated on the basic postulates of all four schools of thought that govern the curriculum development at given periods in time, it is necessary to outline that the current and actual post-methods era favors an eclectic approach to the evolution of online education. At a simple level, as Internet has superseded all other places for the search of information, educators advance the hypothesis of implementing a joint framework of all ideas from behaviorist, cognitivist, constructionist, and connectivist approaches to online instruction. One of the factors that dictated eclecticism in the online teaching-learning process is that online education is not conditioned by geographical distance. Consecutively, online courses might demonstrate student enrollments from different locations meaning that one group consists of diverse learners not only in terms of knowledge or foreign language proficiency but also in terms of cultural, social, and attitudinal differences. That brings us to attend to this exigency to create all-inclusive courses based on the blended approach of all four schools of thought and involve professional instructors who are culturally sensitive and can accommodate the heterogeneous needs of potential learners.

In the following part of the article, we intend to discuss foundations for designing effective and meaningful online courses that rest on the premise of the theories being reviewed above. One of

the first tasks to be addressed in the process of designing an online course is writing course and module objectives. Course objectives are specific knowledge, skills, or qualifications that learners are expected to master once they finish the course. As any course is divided into logical sections or modules, particular attention should be paid to the alignment between course objectives and module/lesson objectives. While course objectives are general formulations of the course expectations, lesson objectives are in the form of specific breakdown parts that step-by-step lead learners to absorb input leading them eventually to meet the intended expectations of the course. Based on behaviorism views, we can state that course objectives should be overt and explicitly stated in the syllabus, respectively, module/lesson objectives are normally presented at the beginning of the lesson plan. Objectives are interlinked with assessment, consecutively they should be measurable. Stipulated mastery of a skill or knowledge in objectives that presumably learners are supposed to acquire must be easily observed and evaluated by an instructor to determine to what extent the stated objective is fulfilled.

Further recommendations for writing course and module objectives:

1. Keeping in mind the SMART model for the objectives is always effective. The acronym stands for specific, measurable, achievable, relevant, and time-sensitive/oriented. A quality-written objective has all mentioned features.

2. It is advised to use the Backwards design for lesson objectives. In short, the Backwards lesson plan design stipulates first to identify what is desired results or outcomes by the end of the module or even a course; second, instructors should think ahead determining the types of assessment practices that can produce acceptable evidence to showcase that expected results are accomplished. In the third stage, it is time to decide what instruction and teaching resources are needed to best accommodate learners to reach the intentions of the course instructor [14, p. 173-174, as cited in Espinoza, 2013]. If the formulation of objectives is approached with the end in mind based on the Backwards lesson plan design, in this context, lesson objectives, and outcomes should coincide.

3. Thinking about the target class participants helps to make objectives relevant and measurable.

4. Always attempting to answer the question of why this objective is important and what kind of learning value it has for the learners helps to stay in the focus.

5. While writing objectives, it is key to concentrate on Bloom's Taxonomy which presents a classified list of verbs that determine the level of difficulty of the activities and reflect cognitive mechanisms in the learning process. The division of lower and higher-order thinking skills helps instructors to precisely assign tasks for objective assessment (refer to Figure 1).

6. Induced by behaviorism philosophy, learners should be always introduced to the objectives of the course and module/lesson. This explicit introduction helps to maintain the focal point on the input and fosters conceptualization of the newly covered material. Let us illustrate the implementation of Bloom's Taxonomy in writing module objectives: the main topic is Feedback-giving practices.

*Practical English (EFL) course for graduate first-year students. Module: feedback giving*

*1. By the end of the lesson, first-year graduate students will be able to distinguish between the notions of destructive and constructive feedback and their characteristic features by analyzing samples of written peer feedback;*



2. As a result of watching a video lesson in the module “Feedback giving” first-year graduate students will be able to apply the new model Praise-Question-Polish to formulate accurate, clear, and non-judgmental peer feedback for the micro-teaching sessions presented by their group mates;

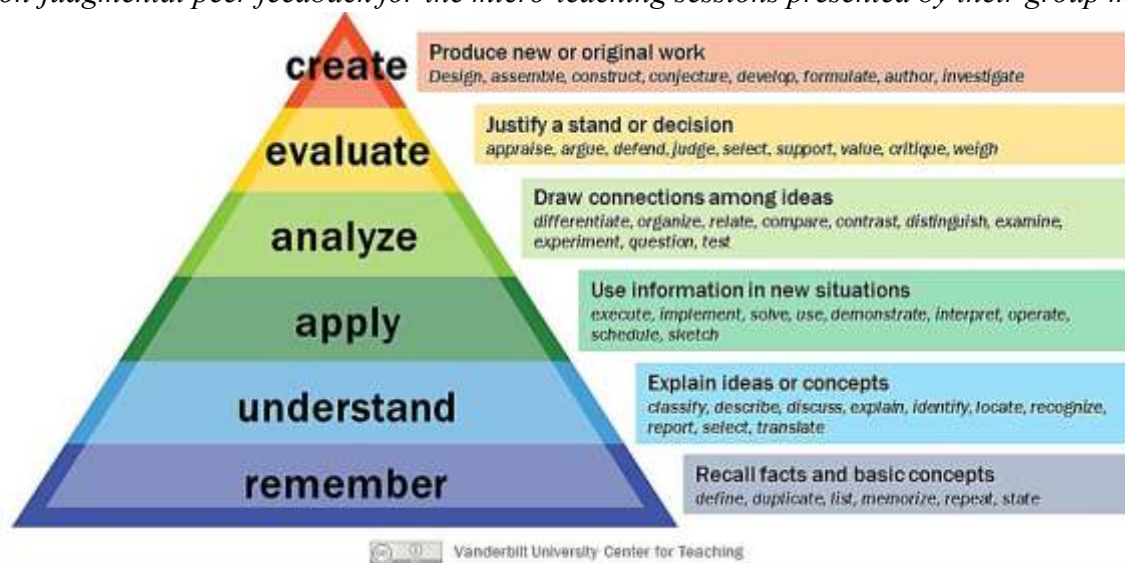


Figure 1. “Bloom’s Taxonomy” by Vanderbilt University Center for Learning, via Wikimedia Commons, is licensed under CC BY 2. (<https://clck.ru/h3SMs>)

7. Online tools for objective writing are also might be used especially by novice teachers or by those who are new to objective writing practice. Using online generators for the construct of objectives might lessen the pressure and provide a starting point. It is notable, however, to mention that there are occasions when it is hard to manage to come up with ready-made polished versions of objectives while using online objective generator tools. It is sometimes, necessary, to reformulate the generated sentences to make them smooth and accurate without redundancies. Our conclusion would be, they are helpful to keep track of all components that should be included in the objectives and they also have a very handy list of verbs to be used, but generated sentences require polishing anyways.

–<https://teachonline.asu.edu/objectives-builder/>

–<https://learning-objectives.easygenerator.com/?hsCtaTracking=df2acba7-3bdc-4cac-8396-8c536587cfe7%7Cb537cd1f-9cff-4aa5-9fc2-7f23f281e43d>

–<https://www.unr.edu/student-persistence-research/outcomes-assessment/learning-outcomes-generator>

Creating effective and practical online instructional materials is the next step in designing an online course. According to D. Yang, there are three best ways to present input to learners in online courses: videos, case studies, and instructor notes [15, p. 7].

The video format is viewed to be effective because it allows presenting studied input in multi-modes establishing links to sensory channels; learners can listen to the instructor’s voice as well as watch the display of the information on the slides. In the video creation process, instructors should take into account the cognitive capacity of learners. The cognitivist approach suggests that information should be thoughtfully selected as the learner’s concentration span is limited. Attention could be maintained, however, if a video is chunked into logical sections. Also, it is notable that key information is better retained if it is repeated at the beginning and the end of the video presentation. In addition, for better retainment of the input, cognitivist pedagogy suggests designing the structure and layout of video materials using certain strategies to assist learners to notice important

information for further processing that leads to transferring knowledge into long-term memory. For example, significant information could be placed in the center of the screen, foreshadowing techniques could be used to highlight key information (boldface, italics, color-coding, or different graphical design). Another productive instructional material in online learning is a case study. It is ranked as number one among presentation-oriented input [15, p. 7].

Many foundational cognitivist and constructivist ideas are reflected in this instructional material. Case studies range in formats and presentations from simple open-ended questions to complex descriptions with supplementary materials to be observed and studied. In addition, students like case studies because they create ample opportunities for thought-provoking discussions based on objective analysis of the presented case which is the domain of constructivist theory. Moreover, case studies are valuable online instructional materials since they facilitate critical and problem-solving skills encouraging learners to be inquisitive and independent observers, analysts, searchers for pragmatic solutions to the given prompt [15, p. 8].

In addition to videos and case studies, there is another powerful instructional tool used for the online presence of the input – the instructor's notes. The instructor's notes are a resume that provides a brief explanation of the covered essential concepts, revealing their key similarities and contrastive points. They are helpful, in particular, when students are tasked to read and process a large amount of information. In such cases, the instructor's notes might have a guiding function helping students to navigate around key concepts of the material. Students become more selective readers while paying attention to the essential information through Instructor's notes.

Having discussed the most potent types of instructional materials, we would like to present a list of online tools for creating online study content. This overview is the result of a personal teaching account that reflects online tools, their aim, advantages and disadvantages, and concordance with personal objectives in the period of lockdown in the 2020-2021 academic year.

In light of the discussion about online tools, it is sensible to give an illustration for one of the instructional materials that we created for the Practical English course using the online tool Nearpod. Objectives of the module are presented in the preceding section above. Our instructional material could be found following <https://share.nearpod.com/r6NfgKRpNdb>. Another key fact to remember is that the objectives of instructional materials should be stated explicitly to learners supported by a lucid explanation. This is a set of objectives designed for the instructional content that we created using Nearpod.

*After processing this instructional material, I-year graduate students will be able*

- *to distinguish between constructive/destructive feedback types;*
- *to apply the new model Paise-Question-Polish to present their constructive peer-feedback in writing as well as for the micro-teaching sessions presented by their group mates;*
- *to familiarize themselves with samples of constructive feedback, its peculiar features and will be able to use sentence starters to articulate explicitly concrete, non-personal, direct, and caring peer feedback in response to written material as well as to teaching observations.*

Personal reflection of the author: *"This instructional material started with a visual representation of the topic. Then, it followed with a short video download from YouTube about constructive/destructive feedback types. There was also a pop-up multiple-question activity at the beginning that tasked students to select the feedback utterances that might seem appealing to hear personally to them. Following that, a video lesson was recorded, which was to be uploaded to the Nearpod, but there were limitations for the size/weight of videos. Ours was considerably large. So, a sensible decision was to chunk it into three parts following the best practices to accommodate the attention span of students. It was arranged in the following sequence, first, the introductory video*

was placed, then came ppt presentation with the data about the Constructive feedback model, and lastly, there was another video with instructor's comments on the samples of constructive feedback in teaching".

Based on the aforementioned ideas further teaching suggestions for creating instructional materials are:

1. It should be kept in mind that students only need minimum information to perform a task;
2. Applying foreshadowing strategies to attract learners' attention to the key information is an effective strategy in the digital environment;
3. It is necessary to take into consideration learners' concentration spans when designing online instructional materials. It is advisable to use chunking where necessary, to arrange lengthy and complex modules in subtopics.

In addition to course objectives and online instructional materials, an equally significant aspect of a powerful and promising online course is designing online tasks and assignments. In digital surrounding instructors might get allured by the abundant choices that are available to create activities. In this respect, teachers need to be sensitive to the needs of students and view technology as a means to an end; it is imperative to align technology and task objectives. Logically, all activities devised to collect student responses need to have explicitly stated objectives so that both teacher and students have a clear vision of what is the exact aim of the task including the potential benefits of completing the assignment. Figures 2 and 3 present an example of the online tool Kahoot which is used to create an activity for knowledge consolidation of the instructional materials mentioned in the previous section of this article.

*The objective of the Kahoot activity is as follows:*

- to assess learners' understanding of the concept of constructive feedback;
- to consolidate newly gained informative input by ways of additional repetition (question format) of the information provided;
- to ensure that learners can recall the right order of the Constructive Peer Feedback model.

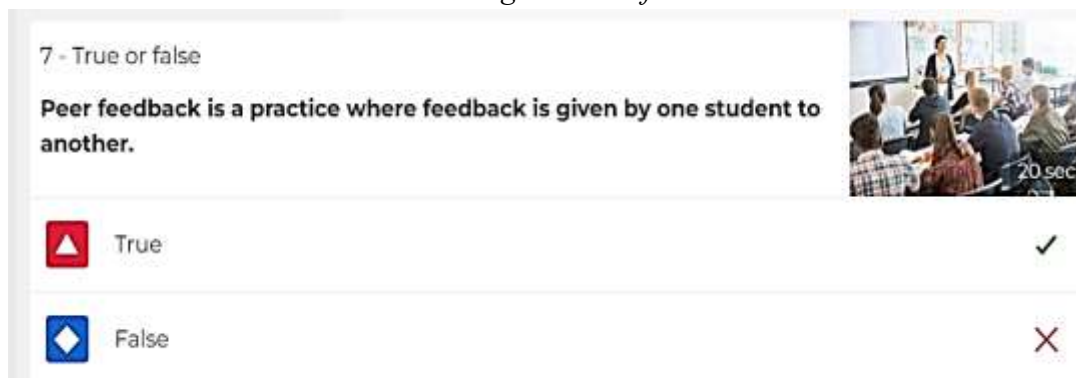


Figure 2. Illustration of Kahoot online tool to create online tasks

The next challenge to be considered is the order of assignments in the online course. While task sequencing is the vast and serious topic as it is, it lies outside of the scope of the present discussion. We restrict ourselves only to the most evident features of arranging task cycles. Having said that, it is key to mention that based on best practices rooted in the cognitivist approach, teachers are invited to design activity chain from known-to-unknown, from easy-to-complex, from the theoretical input-towards-practical application. Our personal teaching experience in 2020-2021 has revealed that the interactive pattern of task type along with the process-oriented approach brought positive results in terms of deeper student understanding of the covered input. To be more specific, this approach is based on pattern repetition favored by behaviorism when the same task is

repeatedly assigned but with different input. Being consistent with the type of the task or adding minor adjustable complements help students be more confident as they are accustomed to the routine of the task. It gradually becomes crystal clear for learners what are the task anticipations and what level of quality is expected from them as they move along from submit to submit refining and polishing their knowledge and skills. Of course, for even better progress and exceptional accomplishments teachers' constructive and timely feedback is vitally important. Another teaching implication that profoundly lends itself to the cognitive perspective is breaking down the major assignment into smaller parts. The process of multi-draft submits and continuous scaffolding practices create sufficient opportunities to embrace not only cognitive presence in the online course but also to feel teacher presence through regular feedback and consultations with the teacher. While engaging collaboratively in a major task stage-by-stage, students tend to interact with each other to clarify certain aspects of the task; this also empowers mutual support and erases feelings of loneliness. One of the ways to engage students in further discussions to facilitate social presence in the online course is to introduce students to work on Discussion Board tasks. Discussion Board tasks have asynchronous nature allowing everyone to address the task at their speed. Discussion boards provide students with extra time to think before engaging in online conversations/before posting anything. This opportunity in asynchronous mode allows eliciting more weighted and balanced responses supported with evidence/justification. Relying on best connectivist practices, searching for outer sources to justify the personal opinion works towards discovery and active learning in a way that students shape their learning process through inquiry that brings out more information to be processed and enhances learners' critical thinking in addition. It is also necessary to diversify the questions in type and format to boost students' interest. There are various ways to alternate Discussion Board tasks with debates, role plays, or case studies/scenarios. In terms of cognitive working memory capacity, it is advised to use different foreshadowing techniques to draw attention to key notions of material in prompt instructions. In addition to foreshadowing important information, we can accommodate the needs of visual students with infographics/images where appropriate in Discussion Boards. The competent instructor's responsibility is to think ahead about the questions and attempt to formulate the prompts in a way to elicit maximum information from the respondents. We present a sample of the Discussion Board instructional prompt as a logical continuation of our topic "Feedback giving" that was mentioned in the preceding sections of the current article. The Discussion Board prompt starts with explicit objectives and ends with supplementary links that students are supposed to watch and analyze before they attempt to respond to the task [Table].

*Students will be able*

- *to train critical thinking skills and enhance their Cognitive Academic Language Proficiency (CALP) by watching and reflecting on lesson observation;*
- *to apply constructive feedback model in response to the performance.*

*PROMPT: Now that you have had a chance to familiarize yourselves with the notion of constructive feedback, it is time to explore and apply Constructive peer feedback into practice. Watch attentively three extracts about a language instructor conducting English class at secondary school and write an independent paragraph (word limit - not less than 350 words) using PRAISE – QUESTION – POLISH MODEL. If needed, use the following set of questions as starting points for your feedback analysis (or you can come up with your ideas):*

- *Why did the instructor start her class in the way she did?*
- *What kind of method did the instructor use in these videos? What makes you think so?*



- Compare the average amount of speech length periods of students and the instructor? Based on the pattern you identify, what could be assumed?
- To what extent students were engaged in activities and willing to follow the instructor's lead?
- What could be done alternatively?

[https://www.youtube.com/watch?time\\_continue=8&v=AjiNuqXr-p4&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=8&v=AjiNuqXr-p4&feature=emb_logo)

[https://www.youtube.com/watch?time\\_continue=8&v=AjiNuqXr-p4&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=8&v=AjiNuqXr-p4&feature=emb_logo)

[https://www.youtube.com/watch?time\\_continue=472&v=P79EqOJAgBY&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=472&v=P79EqOJAgBY&feature=emb_logo)

Table

#### OUR REVIEW OF ONLINE TOOLS

<i>Tool (link &amp; description)</i>	<i>Pros of the Tool</i>	<i>Cons of the Tool</i>	<i>How this tool meets my objective(s)</i>
Nearpod Create interactive presentations (e.g. adding quizzes, Polls, Videos, Collaborate Boards, and more)	User-friendly, variety of interactive activities, access to YouTube video download, speed of downloading/activity is good, activities could be added to the materials, easy to mix, arrange, modify slides	There is not any option to download the created content, only sharing and editing link options. There are limitations for the huge video files, it requires an upgraded version.	It helped to create interactive content through which I can present the input and collect immediate measurable evidence of student participation Engages learners to actively learn and participate in interactive activities, supports varied learner preferences.
Edpuzzle Place interactive content into pre-existing videos from a variety of sources (e.g. TED, YouTube, or personal)	A very similar set of features as Nearpod, easy to access	There is not any option to download the created content I could not find a collaborative board or anything where students can work simultaneously	Engages learners to actively learn and participate in interactive activities, supports varied learner preferences.
My Simple Show Create explainer videos (short videos to explain an idea)	A free version is enough to create simple videos. It took less time to learn how to use it. Built-in templates are available for the storyline, which is created automatically.	For more sophisticated video creation with various features, one needs to pay.	Abstract concepts could be explained visually with the help of illustrations.
Loom Make quick videos capturing your screen, webcam, and microphone	Loom is very similar to Bandicam screen recorder in a way that both allow recording a full screen or only a part of the screen.	It appeared that this tool needs extension, this is not convenient. For longer video recordings a paid version is needed. The free version offers only a 5-minute recording period; Bandicam has a huge advantage extending recording time to 10 mins	Student engagement is fostered by allowing students to listen to personified input with the instructor's voice over the material being presented +viewing instructor notes along the way

Following our discussion, we would like to resume teaching suggestions for creating effective and engaging Discussion Board tasks:

1. Demonstrating teacher presence in moderating the discussion boards brings positive reinforcement;
2. Creative thinking is fostered if we ask students to role-play a character in the forums when the context is appropriate;
3. Designing skillful questions oriented towards higher-order thinking processes is favorable (Socratic question types might be effective);
4. Writing precise but detailed instructions for the discussion board participation and prompt-response is of paramount importance for accurate task-response.

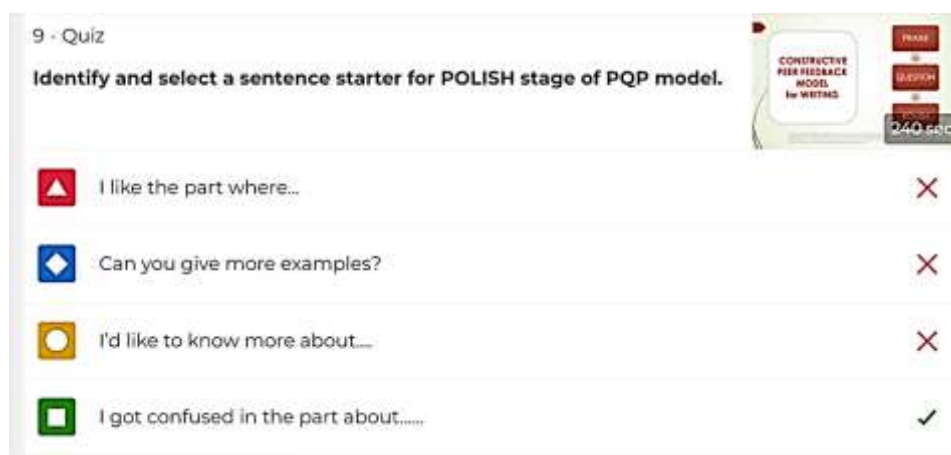


Figure 3. Illustration of Kahoot online tool to create online tasks

This study sets out the aim to discuss major schools of thought that govern online education and their practical pedagogical implications in certain parts of online courses. Taken together behaviorism, cognitivism, constructivism, and connectivism pedagogies play a significant role in online course design. The actual discussion will be of interest for novice and professional teachers attempting to draw a connection between theoretical foundations and practical applications in online courses. In this paper, our focal points were course and module objectives, instructional materials and online tools, features of tasks, and assignments in digital space using the topic “Feedback giving” as illustrative material. Further research, however, should be undertaken to explore other aspects of online courses such as motivation and engagement, and assessment practices in online courses that were not discussed in the current article.

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