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Review Article



# Empowering Students in Natural Resource Management Through Technology-Integrated Learning

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## Abstract

Natural resource management professions require a diverse and evolving skill set that modern education must reflect. This manuscript explores how 21st-century instructional methods—particularly flipped classrooms, educator-produced lecture videos, and Learning Management Systems (LMS)—can engage students more deeply in natural resource topics. By reallocating lecture time to interactive activities, instructors provide dynamic and personalized learning experiences that meet students where they are, both culturally and technologically. This approach fosters student-centered exploration, reinforcing cognitive development through contextualized learning and real-world application.

**Key Words:** Flipped Classroom; Class Videos; Student Engagement; Instructor-Created Content; Natural Resource Education; 21st-century Pedagogy

## Today's Teaching Tools were Initiated Centuries Ago

Pedagogy deals with the theory and practice of teaching and how psychological qualities influence student learning (Petrie, et al. [1], Schunk [2], Higham [3]). Actions, judgments, and styles used to effectively teach students take into consideration theories of learning, understanding student needs, and how to integrate student backgrounds and interests into the learning experience (Powell and Kusuma-Powell [4], Felder and Brent [5], Barzun [6]). Educator interactions within the social and intellectual classroom environment are sublimated from the learning experience into new personalized student knowledge. The classroom may be found in a college environment as students seek a degree, in a museum, monument tour, or it may be found at a field tour site attended by adult learners seeking new knowledge about their forestland management efforts. Effective teaching can further the personal development of human potential to the narrower specifics of vocational education, that is, to the imparting and acquisition of specific skills (Scott [7], Illeris [8], Felder, Woods, et al. [9]).

Students of all ages respond favorably to a mix of effective educational delivery methods that integrate technically appropriate delivery, engaging distribution methods, and fresh research-based content applied to real-world applications (Merrill [10], Saavedra and Opfer [11], Spektor-Levy, Eylon and Scherz [12]). Topics presented to students require them to assimilate current

ideas presented as concrete examples into abstract applications structured in learner's active minds. When the educator delivers messages using current-day technologies and novel delivery techniques, blended with learner integration of current-day technological strategies, student understanding becomes seated deep within their psychological way of thinking (Abrami, et al. [13], Davies [14], Greenhill [15]). Promoting learner autonomy and creativity should be part of the teacher's ultimate solution (Williams, Oliver and Stockdale, Higham [16]).

Education in natural resources is endowed with copious tangible examples of process and procedure results leading to forestland development characteristics where educational moments can be reasoned, demonstrated, observed, and shared. Conveyance of new knowledge can be realized by studying geologic processes afoot, witnessing a sprouting seed, or when examining sedimentation and benthic macroinvertebrates in a nearby tributary. Natural resource educators have readily available and tangible examples to create hands-on illustrations to aid student discovery.

These demonstrated examples become part of the learner's mind as they are personally revealed by the student, written about through a peer-reviewed report, and even explained on a video the student teams create for review by others in the class, their professor, across the college, and out in the wilds of the internet (Cooper [17], Bloom [18]). Learners engaged in collaborative events simultaneously solidify the learning occasion and the socialization benefits made part of the educational experience.

## Concrete to Abstract

Methods used to introduce course topics to students are instrumental to providing specific purposes of why they are tasked to learn materials. The schema theory of learning, originated by Piaget [19] as applied to educating children, and as they matured to assimilate logical thinking characteristics (Simatwa [20], Shayer [21], Inhelder and Piaget [19]), and was further developed by Anderson and others [22], acknowledges how students of all ages learn by connecting new knowledge with their personal real-world experiences. Learning becomes effective when students connect current information with something they already know, and more efficiently, through a medium they are accustomed to interacting with (Tiruneh, Cock and Elen [23], Bransford, Brown and Cocking [24]).

Adult learners differ from the younger students mainly in the mode of effective information transfer from teacher to student. These cohorts traditionally comprehend topics at different levels of integrated understanding: some demonstrating rapid adoption of concepts and processes, others finding it difficult to create intellectual linkages between perceptions (Azevedo, Cromley and Seibert [25], Greeno [26]). The mode of information transfer spans the spectrum of classroom lectures seated to observe a chalkboard, to screen-projected shows advanced one slide at a time as the lecturer talks, to video shows demonstrating actions and events with narration of a process. Finally, information transfer can take place in a nearby forest, alongside a stream, or in observation of a certain bird's nest where students can search for, identify, and discover answers they seek. Whether adult or youthful learners, comprehension surges as information tactility increases in real-time examples with kinesthetic opportunities to touch, feel, smell or recognize (Brand and Dalton [27]).

Meaningful examples are best applied from the life known to students, engaging interests and motivating them through teaching activities to engage tangible examples which can be mentally inter-connected and made relevant to their personal experiences (Ferrari and Sternberg [28], De Jong and Joolingen [29]). Learning enabled through actual real-world examples, while conducting all stages of project development, and solving problems as they arise, creates repeatable discoveries (Bolstad [30], Maserang [31]).

Teaching inductively, that is moving from specific examples to generalities (concrete to abstract), is applied in many learning environments (Tiruneh, Cock and Elen [23], Land and Zembal-Saul [32], Felder, Woods, et al. [33]). Oftentimes, both discovery-learning and problem-based learning finds permanent adoption in the minds of students of all ages (Kirschner, Sweller and Clark [34], Greeno, Collins and Resnick [35]). Students have different learning styles and before students are successfully challenged to assimilate vast amounts of theoretical content or to solve abstract discoveries, they will benefit from first being introduced to concrete, real-world examples (Barnett and Francis [36], Felder, Woods, et al.[37], Land and Hannafin [38]).

## Historical Overview

Western educational expectations have maintained a historical trend of lectures using a chalk board, with teacher-specific interactions with students (Daly, et al. [39], Davies [40], Kaur [41]). In some classes, questions and answers were the expectation of the event. Other instructors forbade interruptions of the lecture, pausing them until the end. Teaching inductively by engaging with students and using experiential learning with active involvement between instructor and students, serves as exceptional learning examples (Land and Zembal-Saul [32], Mintzes, Wandersee and Novak [42], A. Brown [43]).

In the 1980 decade, some professors used mylar sheets on an overhead screen, projected to the classroom's front stage. As fast as the professor could scribble thoughts to the sheet, students were to reproduce them for study: "memorize these statements". Rote memorization was considered by some professors to be a symbol of student learning. Rote historically failed to create the linkage between concrete and abstract thoughts, and it still does (Crutch and Warrington [44], Hilgard and Irvine [45], Warrington [46]).

Some alternatives to rote learning include meaningful learning, associative learning, and active learning (Dwyer, Hogan and Stewart [47], Schunk [21], Brown, Collins and Duguid [48]). Traditional rote approaches do not advance learners' critical thinking skills or empower autonomy found in self-guided discovery. Learners can develop higher-order skills when actively engaging in meaningful enquiry-based learning that has genuine value and relevance for them personally. Natural resources education offers

ample source-materials of real-world experiences merged with sustained engagement and collaboration. Educators who teach natural resource topics inductively can create opportunities where students construct and organize thoughts, engage in research, and expand it through writing and analysis (Kwek [49] Barron and Darling-Hammond [50]).

## Technology Tools

In 1986, Harvard Presentation Graphics computer program transformed computer aided presentation software to be the first personal computer program running MS DOS, to assimilate text, graphics, and charts into custom slideshows (Rufener [51]). Computer slideshows enabled instructors to mix film photographs personally taken and developed into 35mm color slides. Example and demonstration united through instructor experiences and interactions with students to revolutionize classroom-based learning. Harvard Graphics slides remained firmly in the repertoire of professional instructors into 1990 as Microsoft Corporation (MS) introduced Windows and its presentation software solution, PowerPoint. This was amplified through the bundled software package known as Microsoft Office (Microsoft [52]).

Infogram [53] claims that over 6 million teachers around the world used PowerPoint for classroom lectures and that worldwide, the software holds a 95% presentation market share (Greer [54]). PowerPoint ushered features of its predecessor into software available on Windows and Macintosh computer operating systems to combine text, charts, tables, photographs, images, and video graphics. Presentation cost effectiveness was substantially improved as the MS solution exported screen images to local printers and through video projection monitors to classroom screens. MS PowerPoint is the most widely used instructional presentation software in the world today (Greer [54], Voss), and sometimes it is used effectively.

### Ushering Environmental Education to the 21st Century

Educators focus attention on how learners need skills such as critical thinking, the ability to clearly communicate, to solve problems through negotiation and collaboration (Oliveri, Lawless and Molloy [55]). The 'transmission' or lecture model (Kaur [41]) still prevails as a dominant college instructional approach (Saavedra and Opfer [11]).

Unfortunately, pedagogy has not fully adapted to address new challenges introduced with the birth of technologies made available in the world of today. Some methods applied typically instill a sense of student indifference, boredom, and mental distraction during and after lessons are delivered. Instructors can give vigor to learning-events by integrating current delivery technologies with their messages, combining tactile activities with their events, and generating interactive feedback between and amongst learners. Students should interact with mentors and peers while actively learning (Cooper [17], Gucciardi, Mach and Mo [56], Scott [77]). Meaningful educational events are not single interface interactions, and the lesson is not only about the class topic of the day, it is the entire interactive modus of the instructor, every student in the class, and all the examples used, referenced, or imagined by learners (Klopfer, et al. [57]).

Google.com has emerged as one of the largest global companies as it offers web search, cloud storage, Software-as-a-Service, and hosting solutions, often at no direct financial charge to users. A unique service introduced in 2005 and bought by Google in 2006, is YouTube (Hopkins [58]). The video hosting platform enables users to upload, convert, store and playback video content over the internet, often via a structured, scalable solution that can be monetized by creators (YouTube [59]).

Today, the 18 to 34 demographic watches YouTube videos more often than television shows, generally from their mobile devices (smart phones) or tablets (Ingram [60], Klopfer, et al. [57]). These habits are carried throughout college as laptop computers or tablets are added to their computational arsenal. Although the 40+ crowd of adult learners is traditionally accessing the web from a desktop computer, these users also browse from their mobile devices or tablets when out of the office. Some cultures around the world are virtually connected to their preferred news outlet(s), social media channel(s), and audio & video outlets for most of the waking day. Analog information such as newspapers, magazines, and books, have been greatly replaced by digital media accessible on devices previously known best as a "wireless telephone" (Quintanilla and Wahl [61], Campbell, Martin and Fabos [62]).

Educators of college-age students have used MS PowerPoint shows at varying levels of success since 1990 (Greer [54], Voss [63]). These live-presentation shows can be transitioned from instructor led PowerPoint shows to narrated YouTube events. Capturing the broad acceptance of YouTube videos by students, begins validation of educators for those who use this medium to deliver their classroom messages.

PowerPoint shows for live classes can be converted into video shows with audio narration matched with screen timings to guide learners through lectures. These live-presentation shows can be minted into videos ranging from single topics to entire semester class playlists of several consecutive videos. Class videos made from PowerPoint shows include text titles and lists, written comments, charts and graphs. Digital photographs have been augmented with video images recorded on a mobile device or a digital camera. Software solutions allow computer screen image recording to demonstrate how to extract information from software programs (e.g., MS Excel), mine data from online sites (e.g., Federal Reserve Economic Data) (US Federal Reserve [64]), and how to recognize concrete events to guide abstract solution discoveries. Scripts for each show are prepared and recorded into audio narration. These written scripts can be matched with on-screen video images to create precise closed captioning for the viewer.

Class lecture and topic videos are prepared for every class. Students can watch these on any internet connected device. YouTube does not charge users to watch videos, and video creators are not charged for the videos they post. Until 2015, video creators

could rapidly monetize video shows (generate revenue) based on the number of views of their channel's content. In 2016, YouTube required 10,000 views of channel videos before the creator would be eligible for monetization. As of 2018, monetization remained possible, but criteria established by Google.com make creator monetization criteria more difficult to satisfy: 1,000 subscribers, and 4,000 watch hours in the previous 12 months. All videos must be evaluated to allow YouTube to properly determine if new channels create valid content while helping to protect the YouTube creator community's reputation (YouTube 2018).

Monetized or not, YouTube educational videos provide value for intended audiences (Hannafin and Hannafin [65], Spector, et al. [66], Brunken, Plass and Leutner [67]). Videos can deliver many positive effects of the teachable moment, except for taking live student questions. The educator's use of the online video format can provide only a portion of the educational moment's delivery (Phillips [68]). If student-educator interactions can be organized in concert with student video views, the educational impact can be positively multiplied (Klopfer, et al. [57]).

## Changes to Content Delivery Methods

Higher education lecture videos have been placed on YouTube since its inception. However, some of these early videos have featured a filmed lecturer standing in front of the chalkboard and talking without showing the board, no accessory videos, or even a scene of the students in the classroom. The delivery of this online video example fails to capture the possibilities made available by the virtually-delivered-video medium (Rose [69], Groff and Haas [70], Dawley [71]). Other instructor-centric videos on YouTube have filmed the lecturer demonstrating activities but allocated the corner of the screen (about 25% of screen real estate) to display the lecturer's talking face. The image of the lecturer on the limited screen space does not augment the message being delivered to students: it is a distraction.

Lecture videos, made as part of a college class experience, are about the subject matter being taught and how learners internalize the information. The videos are not about the professor, the teaching assistant, or even specific individuals in the class. Successful video production focuses content on the subject matter being taught, provides concrete and recognizable examples of facts and figures, while making opportunity for students to abstract these concepts to their world.

## College Student Course Materials

Recommendations to readers provided here are based on approaches applied to college undergraduate classes using YouTube videos. Students enrolled in a college class are expected to assimilate, process, extend through conjecture, and describe concepts of the class they are taking. Learners require videos targeted to their level of understanding with realistic, clear, and understandable progression to the next higher level. This can be attained through any teaching moment, delivered in person, on a video, or through a combination of various modes of delivery.

Learners in college classes are segregated into two sub-populations, the first attending live classes two to three times a week and the second, taking online classes. Both groups can, and should, receive the same videos applied to each specific class. Live class students can receive a 'flip the classroom' format where students are expected to watch the weekly lecture video before attending class (Stockwell and Cennamo [72], Strauss [73], Ryback and Sanders [74]). When they arrive in class, activities include discussions, projects, experiments, interactions, and some game-playing activities about the topic. Other tasks accompany the learning experience such as reading the course textbook, completing assignments, group tasks, quizzes, exams, projects and a term report. Lecture videos are one part of the entire education experience.

Students can replay class videos as many times as individually wanted. Some students will rarely watch the videos made available to them. Other students will watch each video several or dozens of times to help them prepare assignments, participate in discussions and for quizzes and exams. Making videos one part of a class experience is fundamental to knowledge transfer and expanding comprehension while reaching as many students as possible (Bransford, Brown and Cocking [24], Sandholtz, Ringstaff and Dwyer [75]).

Lecture videos can enable important learning milestones, helping learners analyze and reflect on models (Bielaczyc, Pirolli and Brown [76]). All teaching strategies combine to engage students, empowering them as active learning participants and focusing attention on critical elements. Instructors can enable abstraction of common themes or procedures (principles), while helping students to evaluate their understanding, recall, and integration (Chi, et al. [77]). Competency-based learning, when combined with state-of-the-art learning methods, can embrace inquiry and problem-solving approaches, to help learners develop 'higher-order thinking skills' (Greenhill [15]).

## Learning Management Systems

Obviously, online class activities need to integrate interactions between students and their educator, and between student-peers (Whipp and Chiarelli [78]). These interactions can happen through the Learning Management System (LMS) in the form of discussion-boards, activities with feedback and response. Empowering students to seek outside materials to integrate into discussions students participate in, gives opportunity to extend what they view in class-videos (Land and Zembal-Saul [32]).

Live-class students have the benefit of watching the same class lecture videos as their online colleagues but also participate in live classroom activities. This is the most striking difference between these two groups: it can be a monumental difference, or an insignificant alteration. If the live classroom instructor repeats the content of the video created for the duration of the time spent together, then the message is not amplified, and some instructor credibility may be lost. Instructors who put activities into action in the classroom, or take the classroom outside into natural resource

settings, can explode their educational content delivery to grand levels. This does not mean that every class session needs to head outside for a field trip, nor does it mean that classroom discussions are forfeited.

Instructors at institutions using an LMS, can engage the closed online-interface platform feature to present class materials to all enrolled students. Course materials can be presented to students through this interface where topic videos are posted as embedded links.

The LMS provides a feature to e-mail students individually or en masse on a daily or weekly frequency, manage discussion-board interactions between students and the instructor, and assist students to select concepts they will "Define and Discuss with Example". Students can then be expected to select terms and concepts defined by 10 other students, read their postings, and make meaningful comments as they engage in a written discussion. This technique embraces constructivist-inspired learning environments to empower students to manage their own learning through hypothesis formation, exploration, and direct student-relevant feedback (Galloway [79], Spector, et al. [65], Applefield and Huber [66]). Students in the live and online classes can ask questions, provide feedback, confidentially receive class-material scores on their work, take quizzes and exams.

## Class Initiation

Instructors can initiate an open dialog with students beginning with their first meeting by preparing a class-specific welcome video. The 10-minute welcome video can include the syllabus materials, and explanation of expectations for successful course performance. This is also where discussions about activities, research, reports, and presentations are described. This event gives the instructor the opportunity to create a video for the specific class, narrate it with their own voice, and even show a segment of the instructor addressing the class on a short (20 second) video clip (Rose [69], Ryback and Sanders [74]).

Educators who reach out to their students and address them by name, reference something about their personal history, and connect their chosen course of study with the topics of the subject class, will find greater student adoption of materials taught (Daly, et al. [39], Higham [65], Ferrari and Sternberg [28]). One way to facilitate this is to launch an initial online assignment to all students on the first day of class. Through the LMS portal, create an assignment worth very few points (like 5 points), asking the student to verify what name they prefer to be called, the instructor can tell students this is to verify if they have access to the class LMS portal. Later in the first week of class, launch a second assignment, maybe worth 15 points, asking students to write a page to answer some simple questions, like: 1) what is your selected degree program, 2) what do you hope to gain from this class, 3) where do you come from, 4) where do you want to be in 5 years? The specifics of the questions are not critical, but how these data are used by the instructor can be meaningful in delivery of the class taught.

In the LMS system, for live and online students, score all tasks, assignments, discussion-boards, and reports through the integrated scoring system. Begin all written correspondence with the student, including assignment scoring, by addressing the student by the name they prefer to be called. Write positive feedback about the work performed by the student for each task. Be critical of elements that were not performed to expectations with example of what was missed and was sought.

When possible, give opportunity for the student to resubmit their tasks. Where appropriate, use information the student provided about their personal details they shared in the second-assignment to make example about the subject being covered using the student's interests or background: make the learning event personal to the student's experience. End all written scoring by signing it with the name of the instructor. These simple steps can become time-consuming for the educator, but these steps create unique links between students and their mentor (Campbell, Martin and Fabos [62], Brown, Collins and Duguid [48]).

## Combining Science Topics and Tech Tools

Conveying information with authentic real-world examples, executing tasks from beginning to end, and arranging solutions to complications, all combine to make powerful learning events (Scott [7], Azevedo, Cromley and Seibert [6], Bransford, Brown and Cocking [15]). The semester term-report event begins a journey where students are expected to apply their skills of operating word processing software, and ultimately to prepare a 10-minute PowerPoint presentation, transitioned to a video hosted on their own YouTube Channel.

While many students confidently state they know how to use a Word processor program, only a few have been able to apply stylesheets to their documents, automatically create a table of contents, list of figures, or to use the embedded tools to manage their bibliography database and then auto-generate a Literature Cited summary. Generating their written term report into a PowerPoint slideshow is another challenge for most, and few know how to digitally record and master their voice into a narration track and place it in sync with slide timings and animations.

Prerequisites of natural resource students to know how to use any of these skills a priori is a rare expectation. Students in classes which expect application of these skills, must be taught how to deploy them and to develop these talents in addition to class topic-materials. Typically, students do not develop these technology tools in college, or in the workforce, unless they are explicitly taught them as part of their learning experiences (Saavedra and Opfer [11], Groff and Haas [39]). This realization makes the delivery of technical tools, integrated with their coursework, effective and meaningful (Klopfer, et al. [52]). Students recognize and respond to examples set by their instructors and fellow students, and will recognize videos made, narrated, and deployed by their Professor/Instructor. Instructor made videos may not be made perfectly, and that is fine because the proletarian mode of delivery sets standards which students can equal and surmount. This relaxes

expectations to let students experiment and test their abilities with the technology they have been using most of their lives.

Applying recent technology tools to class-tasks motivates students to experiment with their new abilities by increasing their incentive and personal perceptions of achievement, as they explain a new concept of the term report theme (Spektor-Levy, Eylon and Scherz [12], Voss [63], McCombs and Whisler [58]). When student videos are submitted, instructors should review and comment on them, request specific revisions or accept them for in-class distribution. Class students see the comments made by their peers and instructor. Students read these comments and gain a better understanding of what is sought, but more importantly, they gauge their own performance in unison with their peers (Cooper [17], Hannafin and Hannafin [65], Goodman and Boyatzis [34]).

Final student YouTube videos can be displayed on the LMS interface where other students are expected to watch them and make meaningful comments about the content and pose questions about the video's subject matter. It continues peer discussions in the class, guided by their instructor as electronic feedback is easily given. These procedures recognize how college students today adopt technology, use it, and integrate it into their learning environment while receiving rapid feedback from both their peers and instructor (Stark [83], Papanikolaou, et al. [84], van Merriënboer [85]).

Using the LMS interface, software training videos can be pooled and made available to students to scaffold what they know, what they are learning, and how to use the technological tools made available to them to explain their new knowledge. The videos instructors make for these events may not be inclusive of all steps and strategies available to master software use, but they guide the student's journey of discovery at certain critical steps (Puntambekar and Hubscher [86], Sandholtz, Ringstaff and Dwyer [75]). This approach enables student creativity at each step, while increasing self-ownership of the results (Daly, et al. [39], Erwin [85]).

### Making Videos

Generally, college learners want the content of their class-videos to be fast-paced and short. Short is a subjective time-lapse, but a cursory look at educational videos for people 25 and under on YouTube finds videos averaging around 5 minutes. This time span may work for some single topic bytes. More time consuming is presenting five or more single-topic bytes that are woven together into a fabric of understanding that leads the concrete example to recognition of abstract ideas. In semester classes, a single class lecture session enveloping a textbook chapter may take much longer to address: 30-minutes to 50-minutes. The weekly time allocated to lectures generally covers 150 minutes, so the online video option cuts this about in half.

### Progressive Results

The content of science-based topics uses technical tools to share with students how to create professional word processing documents, mathematically detailed spreadsheet workbooks, and message delivering YouTube videos. The instructor can connect with students in a way that empowers achievement of new levels of professional performance and a sense of proficiency. Teaching how to use these tech-tools in unison with the class content empowers students to accomplish more than anticipated. Once these new learning events are integrated into existing 'ways of knowing', it nurtures learner creativity and originality, while establishing new cognitive habits that remain a part of their mental arsenal (Scott [7], Lai [88]).

## Discussion

Insightful teachers will discover students who want to learn, discover, and mentally grow as part of their college experience. The instructor will challenge those learners with meaningful content mixed with tasks to empower their ability to write about their findings, present clearly to their peers about their discoveries, and psychologically mature within this realm. These students are active learners rather than passive spectators.

Students of today, of all ages and in most learning venue, are exposed to abundant sources of video technology: televisions, smart-phones, tablets, and computers. Learners and educators alike, share their enjoyment on these media sources, but many educators have not embraced the technologies available to them to amplify the delivery of their instructional content to use these media sources. Although there are opportunities to integrate teaching with audio/video production studios, the costs involved are often prohibitive for the faculty member to encumber.

Most universities and colleges use a form of LMS and are given Microsoft software (operating system and MS Office) at no cost to faculty and students (Microsoft [60]). When combined with other GNU software options (Apache Software [89], Audacity [90], Open Shot Studios [91]), faculty can convert their classroom lectures into videos. YouTube created a no-cost medium for faculty to publish their videos where students can view their class content.

Live-class students must dedicate additional out-of-class time to view lecture videos. Instructors can use live-class time, after students have watched the lecture videos, for discussions, abstract idea testing, and associated tasks of the learning event. Online class students receive the benefit of instructor created videos, tailored for their specific class, instead of being borrowed from a different source (Rose [69]), or left with directions to read a textbook chapter, then take the quiz each week. Delivered through the interface presented here, online instructors will expect the course to include other means of engaging student learning within the LMS. Videos are one part of the entire learning experience, not the sole foundation. Integrating class topics into term papers and term video reports captures the intended purpose of learning as a metacognitive event (Scott [7], Bensley and Spero [92]). Students must capture understanding of the topic while discovering how to manipulate the software on their personal computer. This approach engages more student participation and increases learning across many levels. The 21st Century educational experience needs to embrace available technologies to engage students as active learners.

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