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The Flipped Classroom Model and Constructivism in Secondary and Higher Education

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## Abstract

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26 Education needs to continuously change and evolve to ensure student performance is  
27 successfully achieved. Instructors have to be creative and innovative in order to keep up  
28 with educational changes and find ways to increase student engagement, motivation, and  
29 performance. As class sizes are becoming larger at the secondary level due to school  
30 district budgetary constraints and large class sizes are prevalent in higher education, how  
31 will instructors be able to effectively teach, reach out to all students in their classrooms  
32 and also provide a student-centered, collaborative and interactive learning environment?  
33 The flipped classroom model can be used to enhance instruction and improve student  
34 motivation, collaboration, comprehension and student achievement. Teachers and  
35 professors can implement this model to “flip” their classroom so that students “watch or  
36 listen to video lessons at home and do their ‘homework’ in class” (Fulton, 2012, p. 13).  
37 This paper seeks to examine the relationship between the flipped, or inverted, classroom  
38 model and constructivism, identify and analyze research studies that support the success  
39 of this model within the constructivist learning theory, discuss the application of the  
40 flipped classroom model as part of the constructivist learning theory and reason why this  
41 model is important for the instructional design field.

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44 *Keywords:* flipped classroom model, flipped learning, inverted classroom,  
45 constructivism, video podcasts, vodcasts, student achievement, secondary education,  
46 higher education

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48 The Flipped Classroom Model and Constructivism in Secondary and Higher Education

49 **Introduction**

50 According to Finkel (2012), the flipped classroom concept began six years ago  
51 when a pair of high school science teachers from Woodland Park, CO decided to invert  
52 and revolutionize their instruction. Jonathan Bergmann and Aaron Sams recorded their  
53 live lessons (lectures) using screen-capturing software and posted their lessons online on  
54 YouTube for student access. Online video lessons, or video podcasts (vodcasts), are  
55 typically less than 10 minutes in length and consist of “an overview of the lesson, the  
56 content, and end with a summary. Educators can insert their voice, video clips,  
57 photographs, and images, as well as work out problems in their own writing within the  
58 video” (Alvarez, 2011, p. 19). After students watch the videos at home via their  
59 electronic devices (computer, tablet or Smartphone), they return to class the next day to  
60 interact and collaborate with each other as they address questions and work through  
61 problems.

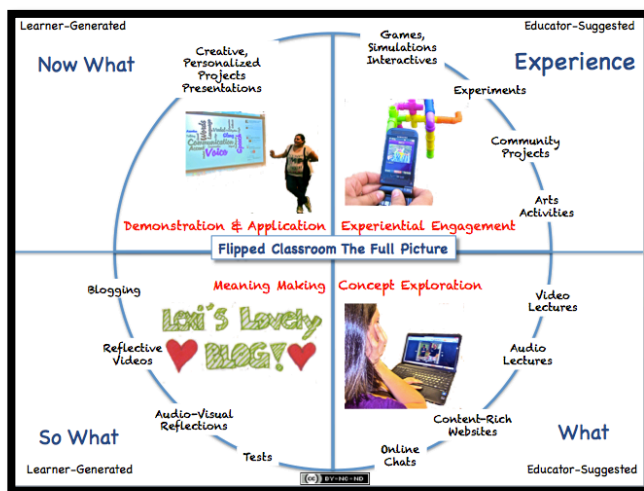
62 A number of research studies have been conducted in secondary and higher  
63 education to examine if a flipped classroom model can effectively enhance instruction by  
64 successfully reaching out to all students in all curricular areas, increasing student  
65 comprehension and achievement as well as providing an active, engaging, motivating,  
66 student-centered, collaborative and interactive learning environment.

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68 **Literature Review**

69 The flipped classroom model incorporates the constructivist learning theory as  
70 research has indicated that this model provides students with opportunities to be active

71 learners who take control of their own learning as they “engage in content at a deeper  
 72 level inside the classroom” (Strayer, 2012, p. 171). Teachers and instructors integrate the  
 73 use of media-rich, digital content in the form of video lessons, or vodcasts, and other  
 74 online resources that students can access and watch at home on their electronic devices  
 75 and then return to class the next day to focus “classroom time on more interactive  
 76 problem-solving activities that achieve deeper understanding – and foster creativity”  
 77 (Martin, 2012, p. 27). Their “homework” involves the collaborative activities they  
 78 complete in class. Figure 1 shows a graphical representation of the flipped classroom  
 79 model.



80 *Figure 1. Flipped Classroom Model – Source: <http://usergeneratededucation.wordpress.com/2011/06/13/the-flipped-classroom-model-a-full-picture/>*

82 Students are able to construct their own knowledge as they work independently or  
 83 collaborate and share multiple perspectives with each other in a student-centered,  
 84 interactive environment. They also apply and make a meaningful connection to what  
 85 they’re learning through hands-on learning activities in the classroom. Students work  
 86 together in small, cohesive groups to apply critical thinking skills and solve problems to  
 87 further enhance their learning and comprehension. Each student has something different  
 88 to contribute and share which can lead to multiple and innovative ways to solve problems

89 or issues. The teacher/instructor acts in a facilitator role to provide students with more  
90 individualized, one-on-one attention to help them comprehend the material they may not  
91 understand. The teacher/instructor also may be able to “identify students who needed  
92 extra help or were too shy to raise a hand requesting help” (Alvarez, 2011, p. 20). To  
93 check for student comprehension and understanding, some teachers and instructors may  
94 give students “daily spot quizzes, often using clickers so the students and teacher get  
95 immediate results. The feedback allows for group discussion and peer instruction on the  
96 problems that many students are struggling with” (Fulton, 2012, p. 13). Teachers and  
97 instructors may also give students the opportunity to create their own project-based  
98 assessments to ensure that they learned and mastered concepts (Finkel, 2012). As a  
99 result, the flipped classroom promotes “better relationships, greater student engagement,  
100 and higher levels of motivation” (Tucker, 2012, p. 82).

101 In the secondary classroom environment, the flipped classroom model appears to  
102 have grown in popularity within the past six years. According to Finkel (2012), the Ning  
103 social media site of the Flipped Learning Network estimates that there are now more than  
104 9,000 users that have signed up on their network. Research conducted by this network,  
105 “based on a survey of 500 teachers, has shown that flipped learning is probably more  
106 common in junior and high schools, although used as young as fourth or fifth grades, and  
107 more frequently used in science and math classrooms” (Finkel, 2012, p. 28). Teachers  
108 that are flipping their classrooms have had seven or more years of experience in the  
109 classroom and are also more flexible, comfortable with their subject matter and better  
110 able to handle chaotic situations that might result from working with students at  
111 differentiated levels.

112 According to Berrett (2012), it seems that “flipping” the classroom in higher  
113 education is not anything new. It has been used for a long time by professors but without  
114 the use of digital media to distribute content. For example, students in English courses  
115 are expected to read a novel and then discuss it in class and law professors expect  
116 students to study the reading material before being grilled with questions in class. What  
117 makes “flipping” innovative today in higher education is that students have access to  
118 technology where lectures can be recorded as video podcasts and delivered online. In  
119 Parslow’s (2012) commentary about the Khan Academy and flipped classroom he  
120 mentions “in the flipped classroom, the teacher shifts from being the ‘sage on the stage to  
121 the guide on the side’” (Parslow, 2012, p. 337). Professors are viewed more as coaches  
122 who motivate their students to “think outside the box” and provide them with immediate  
123 feedback. According to Strayer (2012), “students in inverted classrooms have more space  
124 to reflect on their learning activities so they can make necessary connections to course  
125 content” (Strayer, 2012, p. 192). In other words, the instructor has to incorporate the use  
126 of online communication tools, such as discussion boards, to ensure that students can post  
127 and share their self-reflections to make meaning from the content.

128 Professor Eric Mazur of Harvard University has been flipping his physics courses  
129 for more than 20 years. He implements peer instruction (PI), a student-centered learning  
130 method, where students work in small groups to collaborate and share information and  
131 also discuss and answer questions about concepts during class. Dr. Mazur’s research has  
132 proven that “PI-taught students demonstrate better conceptual learning and similar  
133 problem-solving abilities than traditionally taught students” (Lasry, Mazur, & Watkins,  
134 2008, p. 1066). He uses student response systems, or clickers, to engage his students by

135 asking them questions and having them respond with these devices. Once students have  
136 submitted their answers, he tells them to find someone who is seated next to them who  
137 has selected a different answer and try to convince them their answer was the correct one.  
138 He says that, “once you engage the students’ minds, there’s an eagerness to learn, to be  
139 right, to master” (Berrett, 2012, p. 5).

140 In Offutt’s (2012) article about flipping his graduate software-testing course, he  
141 discovered there are four advantages to the flipped classroom model. First, students can  
142 watch the video lectures on their own time and work in groups to solve problems, which  
143 can be quite beneficial. Second, students can pause the video lectures if they can’t watch  
144 them in one sitting and then play them again at any time. Third, students at varied  
145 academic levels can proceed with the video lectures at their own pace/speed. Fourth,  
146 professors are able to focus more on individual student needs during in-class time.

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### 148 **Application**

149 In the aforementioned discussion, the flipped classroom model has been  
150 successfully applied in the secondary and higher education sectors. The learning  
151 environment could also be flipped or inverted if the instructional designer is developing  
152 e-learning or online training courses in the corporate sector. The instructional designer  
153 can develop online modules in a Learning Management System (LMS), such as  
154 Blackboard or Moodle, and chunk down each module into three to five minute videos of  
155 content. Videos can be created using Articulate or Captivate screen-capturing software.  
156 Different stages or levels of training can be designed, where each stage increases in  
157 complexity as trainees complete each module at their own pace. Trainees start at the first

158 level and work their way up to the most difficult level. The corporate trainer can then  
159 meet with trainees in a face-to-face or virtual environment, using Skype or Adobe  
160 Connect, to arrange them into small groups or pairs as they work together and interact  
161 with each other to complete online activities. The online activities can present situations  
162 where each active learner in the group constructs their own knowledge as they are given  
163 opportunities to identify and solve problems or issues that might occur in the field. The  
164 instructional designer could add an online discussion board or forum in the course so  
165 trainees can become engaged in their learning as they share information and collaborate  
166 with each other. An email section could also be added to the course so the trainees can  
167 send emails to the trainer to address questions or concerns about the content and meet the  
168 trainees' individualized needs. Once trainees have completed all of the online modules  
169 and activities, they can submit a self-reflection via the discussion board to share with the  
170 other trainees and make meaning of the content.

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### **Conclusion**

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From an instructional design perspective, the flipped classroom model incorporates the constructivist learning theory, which can be implemented in a variety of learning situations. Research studies support flipped model implementation in secondary and higher education as it results in more positive impacts on student learning, more effective instruction, improved problem-solving skills and increased student engagement and motivation. One disadvantage of this model might be that instructors might find it quite time consuming at first to develop their video lessons. Peer instruction and collaboration is a vital component of effective implementation of this model in higher



181 education and may need to be incorporated more frequently at the secondary level.  
182 Secondary and higher education instructors with large class sizes can also implement this  
183 model to accommodate the needs of many learners. As education and technology  
184 continue to evolve, it is important to examine the impact of the flipped classroom model  
185 in the secondary and higher education sectors.

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