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Learning Vlogs: Achievement in Engineering Graphics through Self-Regulation

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Learning Vlogs: Achievement in Engineering Graphics through Self-Regulated Learning

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Abstract
Bandura's Social Cognitive Theory (SCT) asserts we are not driven by inner forces or controlled by their environments. Rather, we motivate our own behavior and development. This theory is foundational when understanding self-regulated learning. Self-regulated learning is learning guided by metacognition and motivation to learn. Through a series of assignments that challenge students to reflect on their learning, Learning Vlogs (video blogs) were implemented in a first-year engineering graphics course to provide an opportunity for students to explore their individualized learning styles. Results of self-reported student data show that self-regulated learning reinforced course concepts, promotes mastery, and help students develop "soft skills" including verbal communication and teaming.

Research Question
How does self-regulated learning affect student engagement and achievement in an engineering graphics course?

Introduction
Graphical Communications is designed to familiarize students with drafting principles, engineering drawing, three dimensional visualization skills, and the fundamentals of a computer aided design program (CATIA). Students learn orthographic projection via hand sketching and how to model their sketches in CATIA (Figures 1 and 2).

Methodology: 3-5 Minute Video

Define
Oblique/Cylindrical Surfaces

Describe
Usage/Steps to Sketch

Demonstrate
Isometric Drawings

Student Instructional Videos

Figure 2 Sample CATIA models showing orthographic projection progressions

Student Feedback
How has self-regulated learning affected your engagement and achievement in learning orthographic projection in engineering graphics?

Mastery
- "Practice and perfect skills"
- "Master it along the way"
- "Fully grasp the material"
- "Able to tackle future problems"

Deliberate Practice
- "Spoke out loud to myself"
- "Practice until you get it"
- "Interact with the material"
- "Explore my own way"

Performance and Achievement
- "Focus on weaknesses"
- "Develop other skills"
- "Figure out obstacles"
- "Identify strengths"

Depth of Student Thinking
- "Fuller immersion in the material"
- "Made me think"
- "Ensures comprehension"
- "Reinforce my thoughts"

Conscious Focus on Learning
- "Realize knowledge gaps"
- "Going step-by-step"
- "Enhance my knowledge"
- "Forces my understanding"

Reflection and Responsibility
- "Searched online"
- "Explore beyond the topic"
- "Used more than one book"
- "Research new methods"

Research to Practice
Self-regulated learning was applied to the engineering discipline in this case, however, this construct has proven successful to enhance student learning in business, humanities, and the arts. By encouraging students to seek outside resources, learn at their own pace, and in their own way, students were able to "fully grasp" the concepts introduced. The researcher plans to implement this type of assignment each semester.

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See all videos at https://goo.gl/H685hO