

Strengthening Student Knowledge through Instructional Videos of Hands on Activities

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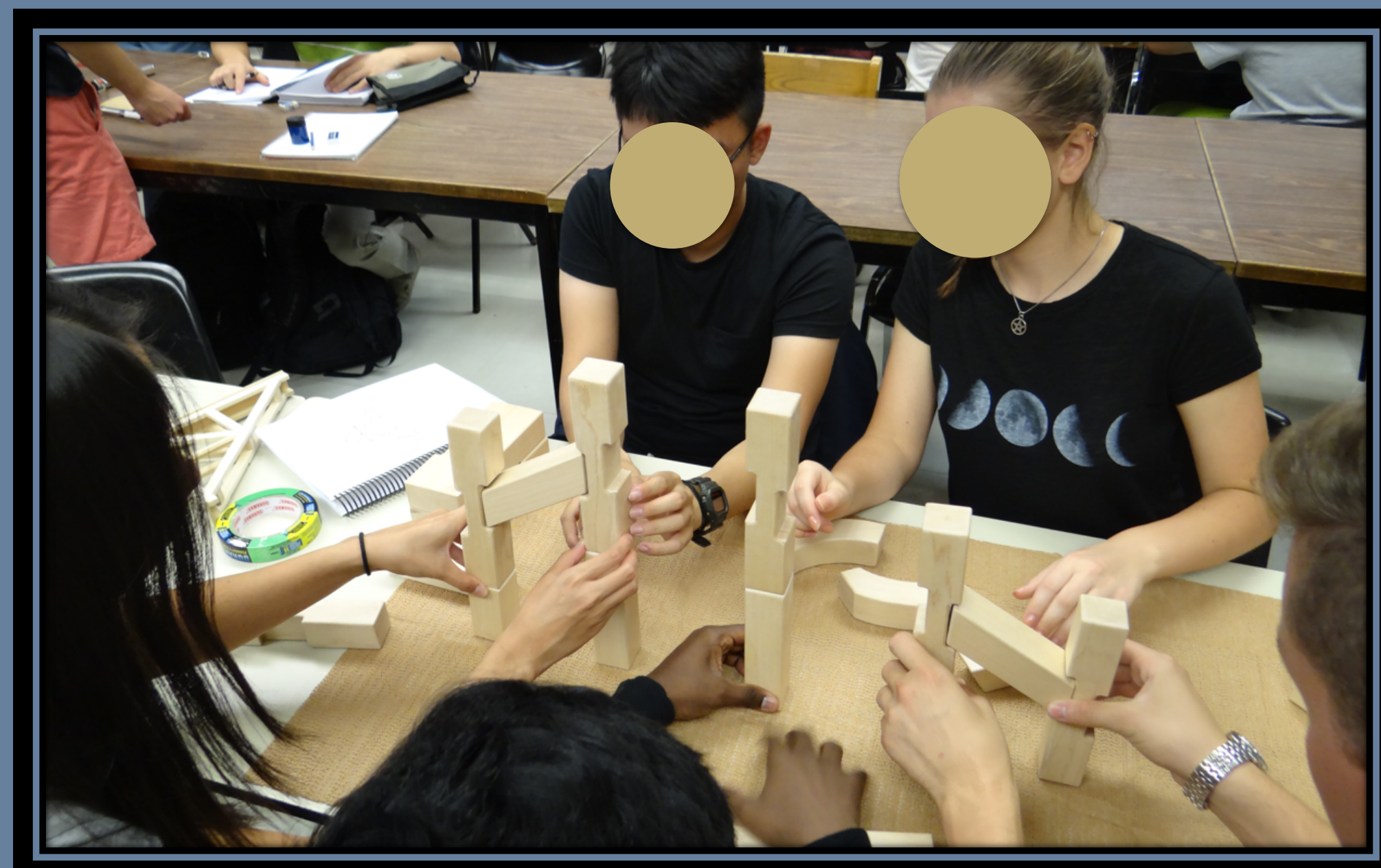
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Introduction

In a first year mechanics course, engineering students participate in several hands-on classroom activities. Each activity addresses a fundamental mechanics concept. Due to time constraints, students have time to experience only 2 of the 7 custom activities.

Videos for each activity will be developed 3 to 5 minutes in length. They will parallel the key steps in the activities so students can experience them vicariously.



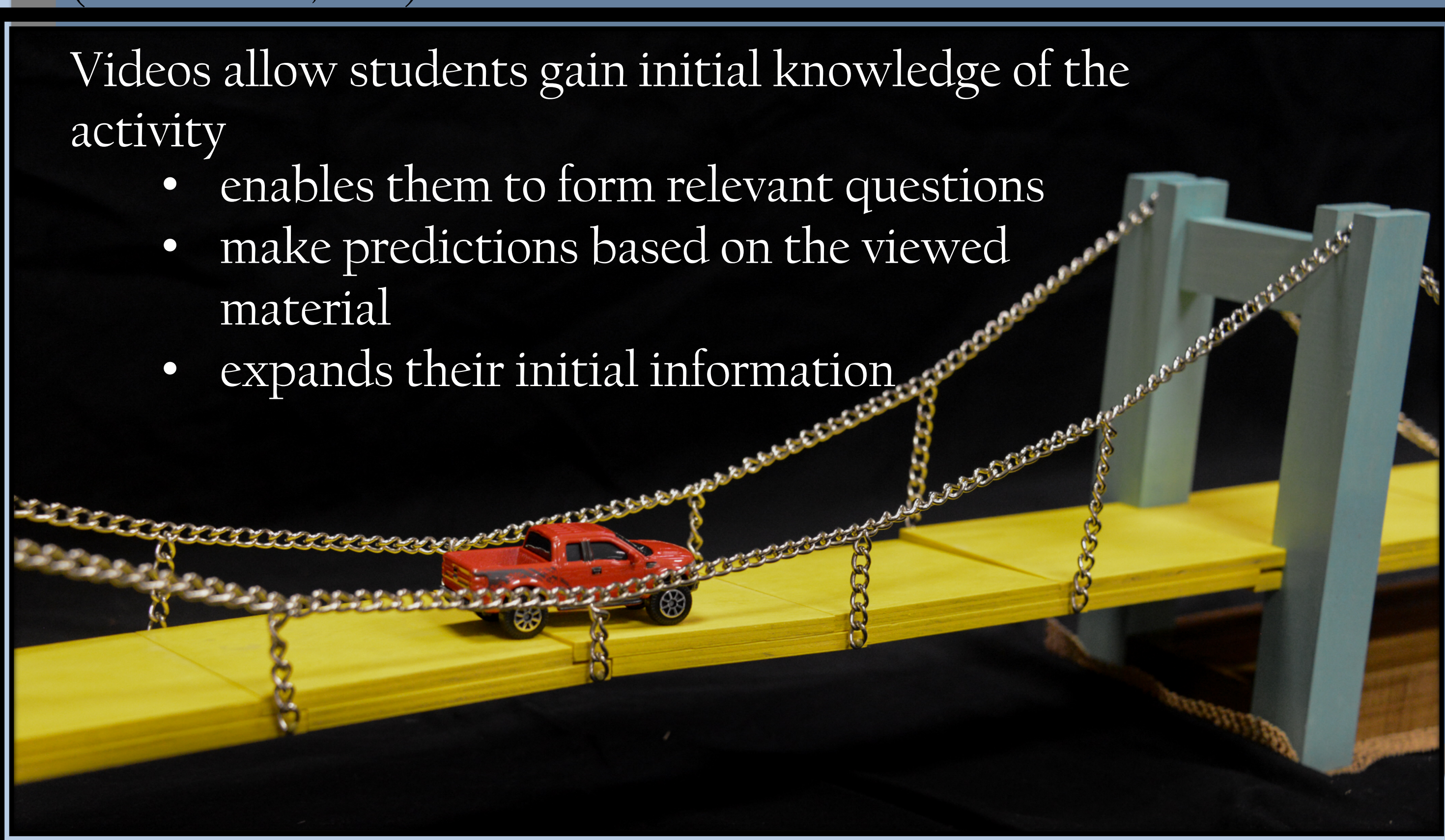
Phases of Learning

Before;

Without the videos students are less likely to have initial reflective learning and limits experiential learning. Students need prior knowledge at a certain minimum threshold to expand long term memory. (De Boer et al., 2016)

Videos allow students gain initial knowledge of the activity

- enables them to form relevant questions
- make predictions based on the viewed material
- expands their initial information



During;

While completing the activity with the use of the video,

- Students require less time to complete their task. (Kaylee Stahr Wynkoop, 2015)
- Increase personal reflection and work efficiency
- Allows for a teaching strategy that re-establishes classroom content outside the confines of the “rush of minute-to-minute practice”. (Tanya Crist et al., 2014)
- Deeper learning during the activity and in future courses through reflective learning.

After;

- With the seven videos students can engage and learn from the five activities they did not do.
- The activities the students experienced will pave the way for them to learn from the somewhat parallel approaches they see in the videos.
- accelerate student learning curve when learning mechanics in upper years
- Will be a resource for upper year students while studying the concepts in further detail

Assessments

Intended outcomes	Sources of evidence	Plan for analyzing evidence
Reflective learning	Questionnaires before and after activity, and with and without video viewing	Correct responses to specific activity-based questions will indicate the degree of student success in reflective learning.
Efficiency when doing the activity	Lab completion effectiveness, student perception of activity, and quality of written reports.	Compare completion time of students with and without watching videos. Compare student perceptions of the videos. Compare report averages of the students without the videos to the ones with videos.
Increased memory retention	Mini quiz or iclicker question Class average on exam questions related to the activities after the theory is learned	Carry out question to find initial understanding. Compare the course average of the students who did not have the videos with that of those who did.

Supervisors;
Wayne Brodland and Rania Al-Hammoud