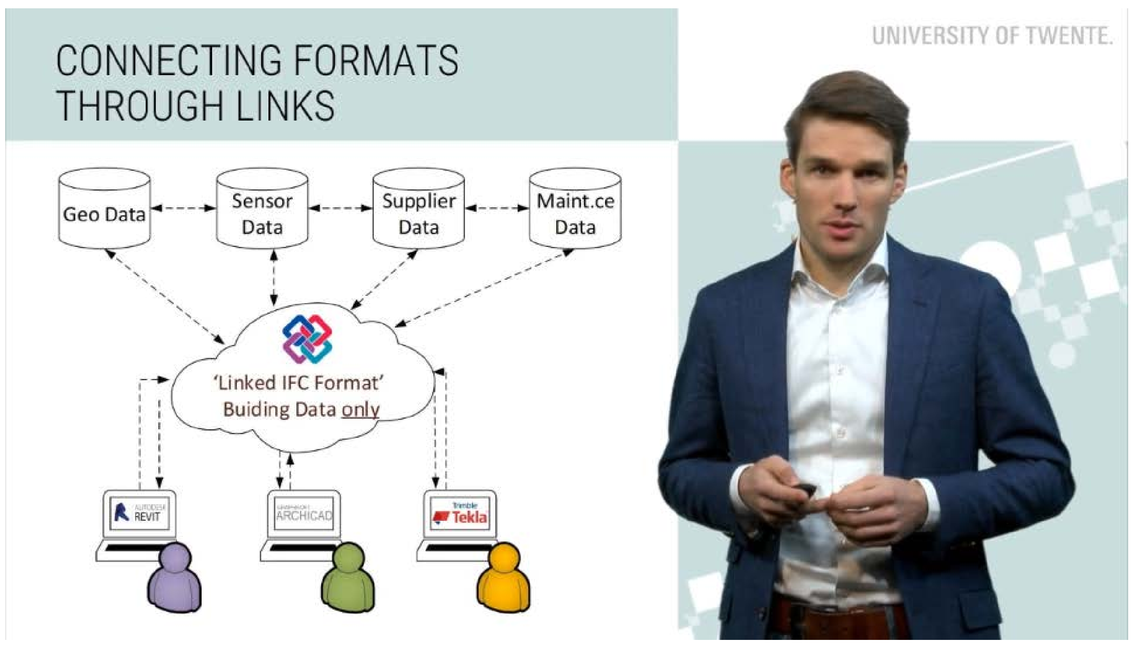
Flipped micro-lectures: more enjoyable and higher performing classrooms?

Introduction

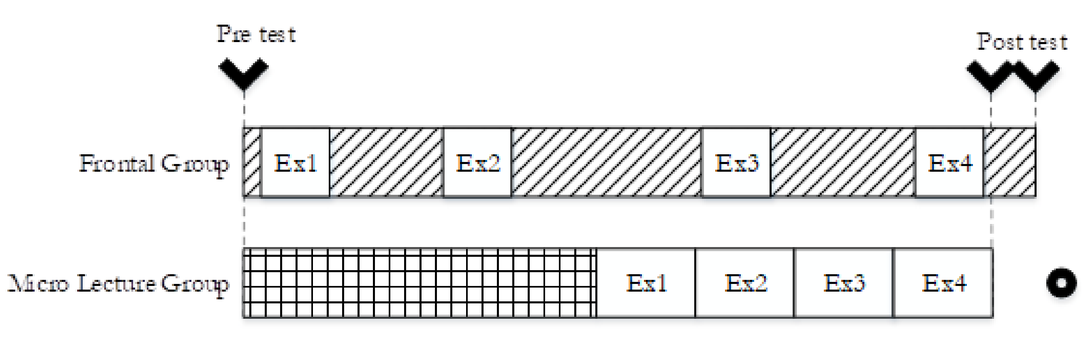
Multimedia recording facilities and broadband internet access create the opportunity to use videos as instructional means in teaching. In engineering courses, for example, videos demonstrated that students study effectively outside lecture hours, and on their own pace to obtain modeling skills.

However, little research exists that focuses particularly at one type of video: the micro-lecture. Micro-lectures are online instructional videos of around five minutes. They explain the basics of a concept. It is unclear how micro-lectures influence learning.



Research question and approach

This study investigates how micro-lectures influence satisfaction and performance of students. Research questions are (1) to what extent does the micro-lecture contribute to increasing students' performance? And, (2) to what extent do students perceive the micro-lecture instructional method as enjoyable? We compared two conditions: a traditional frontal lecture (control) and a micro-lecture with a follow-up in-class session (experiment condition).



We randomly allocated 27 M.Sc. students of our Building Information Modelling (2018|19) class. The control group attended a 90-min regular lecture, the experiment group watched five micro-lectures (of resp. 3:55, 6:36, 3:24, 2:42 and 6:45min) and spent 75 min. in class to make exercises and discuss learning material.

We quantitatively assessed the achievements of both groups with pre- and post-tests and held a focus group to qualitatively study the experiments group's enjoyment with micro-lectures.

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Results

The Wilcoxon 2-tailed sign test shows that both the experiment (p=0,00) and control group (p=0,039) performed better at the post-test. Outcomes of the Mann Whitney U Means test further reveals that there was no significant difference between the pre-test scores of the two groups (p=0,121, U=50,0; α=0,05). The difference between the post-test scores of the groups was significant (p=0,021, U=25,5; α=0,05).

	Pre-test		**Post-test**	
Condition	Mean	Var	Mean	Var
Frontal (control, n=12, 10)[a]	4,1108	1,600	5,3770	2,792
Micro (experiment, n=13, 12)[a]	4,8200	1,568	6,8250	0,814

[a] number of participants in the pre-test and post-test

The focus group findings are that micro lectures:

- helped to study learning material more concentrated,
- were more attractive to repeat and replay, and
- gave increased control over learning processes.

In combination with the in-class session, the lectures:

- triggered participants to prepare for in-class engagement,
- increased their sense of understanding,
- created livelier in-class sessions, and
- helped retain knowledge.

Participants stated that micro lectures were more enjoyable than frontal lectures.

Discussion and Conclusion

Despite the enhanced performance and enjoyment, we cautiously interpret the results, since the sample was small (n<15) and the scale of the experiment was one lecture only.

This study contributes:

- To the literature on multimedia learning: insight on the benefits of short instructional videos and their impact on students' performance and enjoyment.
- To (civil) engineering education: a basis for discussions about micro-lectures as an alternative to frontal teaching.
- To our BIM course: the motivation to adopt more micro lecturing in the future.

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