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The Association between Theory of Intelligence and Cognitive Load Perceptions in MOOC Learners – Study Set-Up

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INTRODUCTION

Growth mindset promotes motivation, keeps the learner engaged, and leads to better academic performance (Blackwell, Trzesniewski, & Dweck, 2007). How this effect may occur during learning is less known, in particular in terms of the learner's cognitive process as indicated by cognitive load theory (CLT) (Sweller, 1994). In CLT cognitive load (CL) is operationalized as the self-perceived mental effort the learner exerts during learning. It has been suggested that motivation factors may facilitate learning by directing attention to cognitive processing (e.g. CL) that is beneficial for learning (Moreno & Mayer, 2007). To date, there is limited research investigating the relationship between motivation and CL. An observational study based on medical simulation training (Cook, Castillo, Gas, & Artino Jr, 2017) found that learners rated themselves higher levels of growth mindset reported more germane processing and less extraneous load, but did not differ in perceptions of task complexity (e.g. mental load). These findings suggest a possible link between mindset and CL in conventional learning settings. This effect may be also apply to online learning formats such as Massive Open Online Courses (MOOCs). The importance of investigating learners' CL in MOOCs has been emphasised by several researchers (e.g. Mayer, 2017).

RESEARCH MODEL AND HYPOTHESES

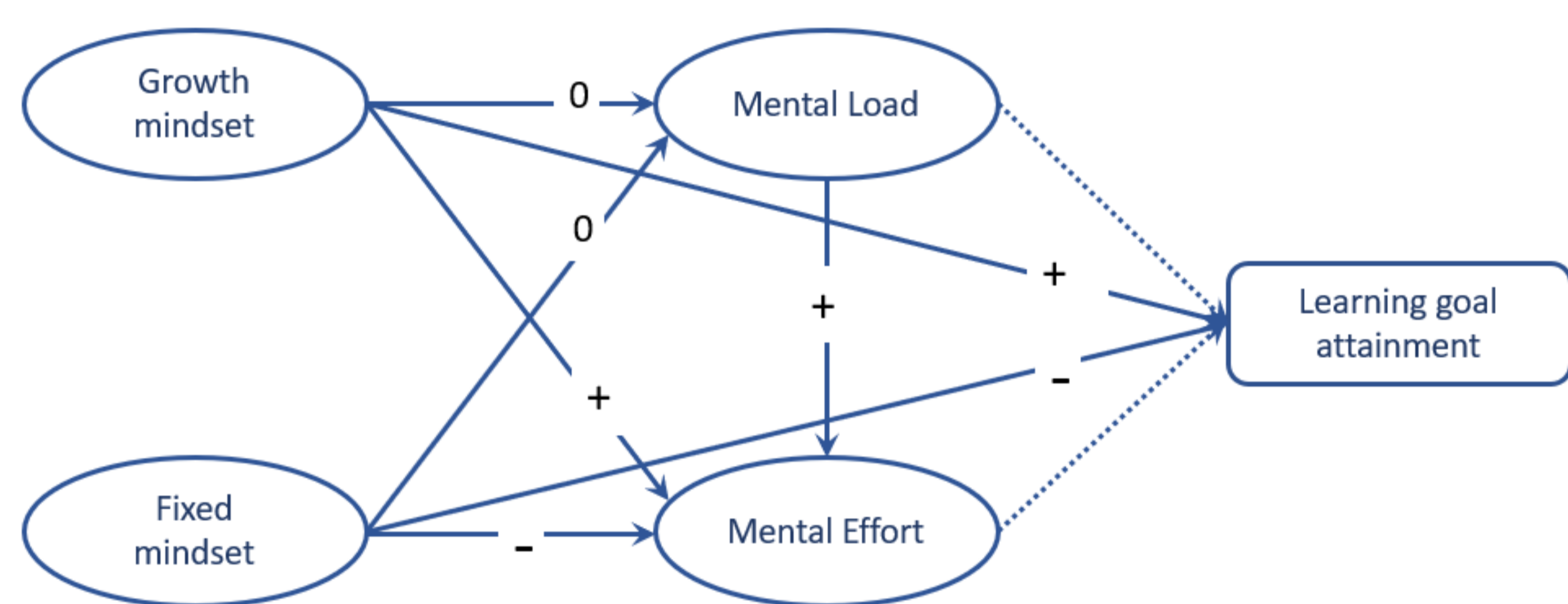


Figure 1. Path diagram representation of the relationship between mindsets, CL and learning goal attainment

HYPOTHESES:

- H1: Mental load → Neither growth mindset nor fixed mindset will be correlated with mental load
- H2: Mental Effort → Growth mindset will be positively correlated with mental effort; Fixed mindset will negatively correlated with goal mental effort
- H3: Goal attainment → Growth mindset will be positively correlated with goal attainment; Fixed mindset will be negatively correlated with goal attainment; Mental load and mental effort may or may not be correlated with goal attainment

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METHOD

Participants and materials

Participants will be learners from MOOCs offered by the MOOC platform Hasso Plattner Institute. These MOOCs cover different subjects in information and communications technology for which between 1500 and 15000 learners enroll. The aim is to collect at least 500 completed surveys. The survey results may be complemented by a to be determined number of in depth interviews on the basis of convenience sampling to provide insight into learner interaction with the MOOC.

The survey will contain questions regarding basic demographic information as well as items for the following constructs in 7-point Likert scales :

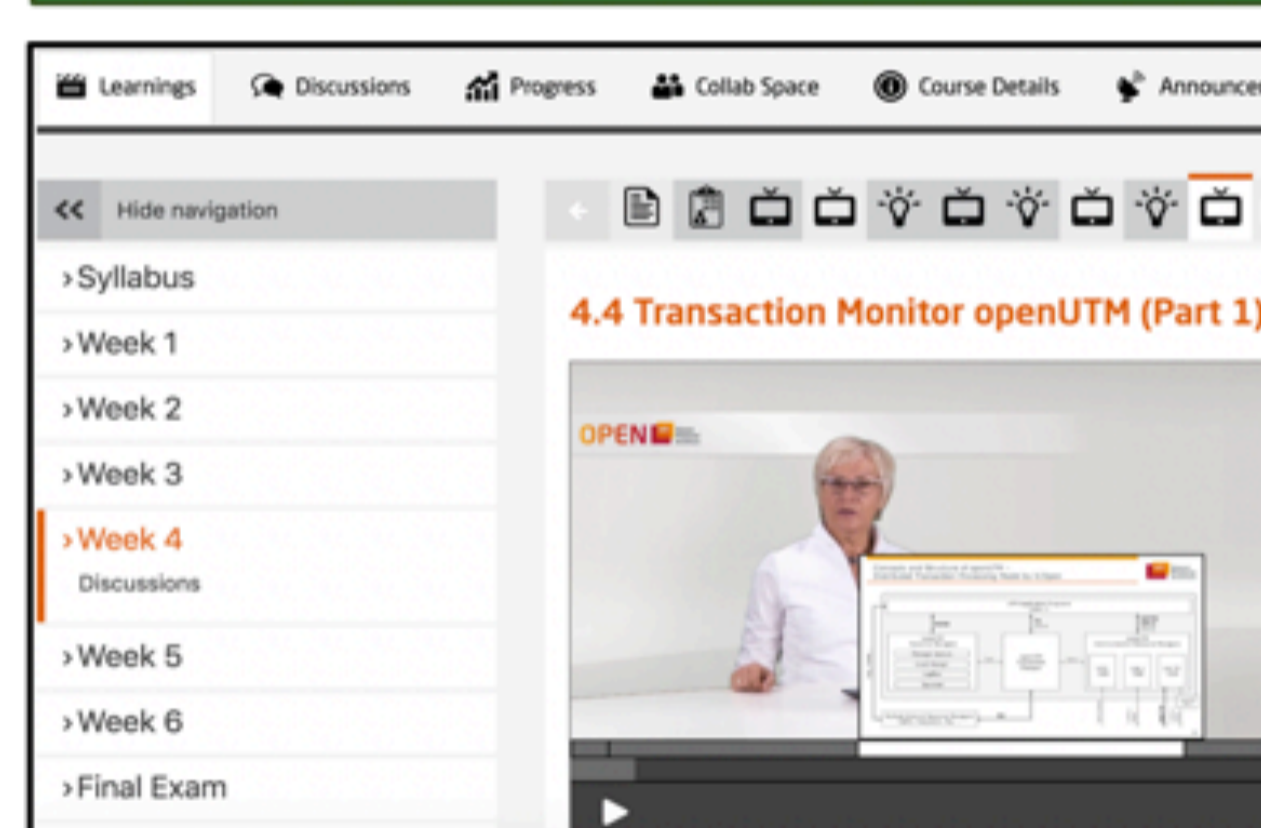
Mindset (Dweck, 2017):

“you can always substantially change how intelligent you are”.
“your intelligence is something about you that you can't change very much”.

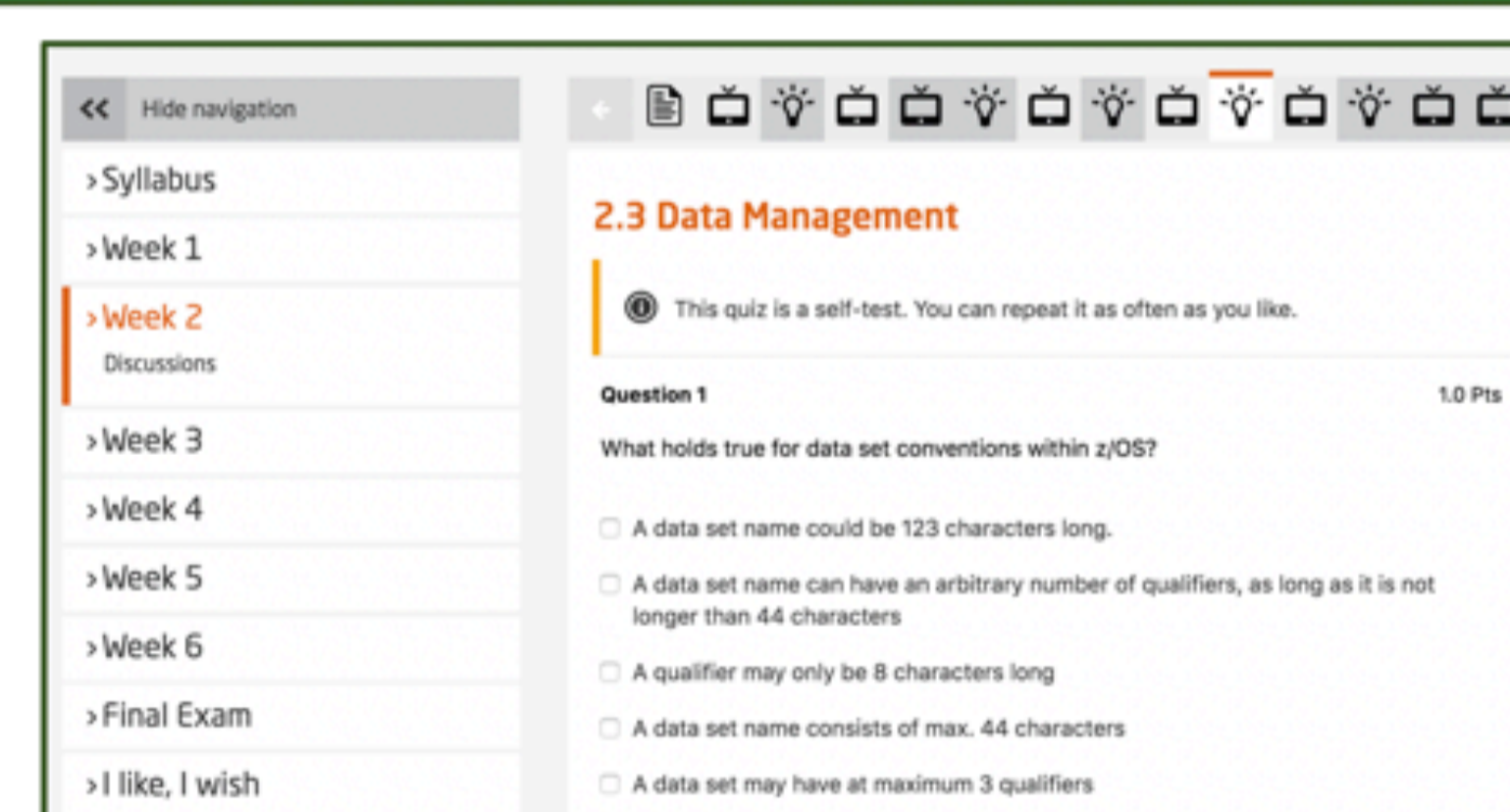
Mental load and mental effort (Krell, 2017):

“The content of the video lectures in this course was complicated”.
“I have made an effort when working on the learning tasks in this course”.

MOOC interfaces



Example of video lecture as commonly used in MOOCs



Example of learning tasks as commonly integrated in MOOCs

Individual goal attainment (Henderikx, Kreijns & Kalz, 2017):

“I achieved my personal learning goals in this MOOC”

Analysis

Latent variable structural equation modeling will be used to assess the expected associations between mindset beliefs and cognitive load. In addition, the conducted interviews will be analysed by using Dedoose software.