Learning Concepts and Principles in Macroeconomics: Analysis and Implications of a Video Lecture

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Abstract

In digital learning, the study of Macroeconomics can be cumbersome even with technological affordance. Learners can be confused with so many disruptions due to numerous audio-visual presentations, animations, and other dynamic illustrations which ultimately reduce knowledge absorption.

The purpose of this paper is to ponder upon learning concepts and principles as applied in a Macroeconomics video lecture in order to serve as a guide for quality knowledge assemblage aiding students' deeper understanding of the discussion on the effects of a government multiplier to fiscal policy expansion with the use of graphical illustrations. Result indicates that technological affordance for meaningful learning should hone critical thinking skills as students apply various learning concepts and principles in studying complex video tutorials.

Keywords: cognitive information processing; cognitive load theory; economics video lecture; learning theory; macroeconomics.

1. Introduction and Background

The study of Macroeconomics is generally perceived as cumbersome due to its indulgence on technical jargons, mind-boggling mathematical and graphical illustrations sweeping through every chapter of a typical book in Economics. Because of this, students become less cognizant to absorbing meaningful learning. Along with such difficulty, digital learning such as the use of animated video lectures can create overall learning disruptions because students have to navigate through the technology essentially taking away focus on dissecting content.

Because of the foregoing, optimal learning can be realized when students are oriented with learning concepts, principles, and theories to guide them through their journey while using technology. Learning concepts are generally explained in the light of the opinions of behaviourists, connectivists, and humanists (Behlol, 2010). Such philosophies ground overall learning experience altogether creating a web of critical thinking through robust analysis and exploration of learning content.

This video lecture is intended for students enrolled in Macroeconomics in the undergraduate level. Its purpose is to provide an in-depth understanding of the government spending multiplier and its effect on fiscal policy expansion. Developed by Welker's Wikinomics as part of a video lecture series, it utilizes multimedia using audio-visual resources with interactive graphical illustrations done on the computer and zoomed for better viewing. Retrieved from YouTube, this video bears the name of Jason Welker under the topic title but there is no indication whether he is the lecturer or if he simply uploaded the material.

1.1 The objectives of the video lecture are:

- To define the concepts fiscal policy, multiplier, marginal propensity to consume and marginal propensity to save

- To explain expansionary fiscal policy using government spending as a tool for aggregate demand expansion.
- To evaluate the effects of an increase in government spending on the multiplier via the marginal propensity to consume and marginal propensity to save.

2. Analysis

The video lecture highlights principles and concepts of the Cognitive Theory of Multimedia Learning which states that multimedia narration and graphical images produce verbal and visual representations, which integrate with prior knowledge to construct new knowledge (Mayer & Moreno, 2002). Indeed, verbal discussion of the lecturer on Fiscal Policy Multiplier and its effect on aggregate demand and output is enriched with graphical illustrations that are simultaneously explained with indications of shifts of the aggregate demand (AD) curve to the right indicating an expansion of government expenditures (G) as the lecture describes. This verbal-visual combination follows the Theory of Dual Coding which suggests that we have two types of working memory: one verbal and one visual, and that we learn best when both channels are used together, rather than overloading one or the other (Sorden, 2005). Moreover, Dual Code Models of Long-Term Memory (Driscoll, n.d.) suggest that learning is achieved best when verbal and imaginal codes are combined in instruction. In the video, the presence of graphical illustrations which represent the visual and imaginal part aid learning in conjunction with verbal narrative. This is also called the principle of modality effect.

Another multimedia principle present in the lecture is the "worked example effect." The lecturer basically demonstrates completed problem sets thereby increasing transfer of knowledge as they guide and deepen understanding of the concept of marginal propensity to consume (MPC) and its effect on the multiplier, shown in the numerical example to illustrate the effect of MPC on AD expansionary policy to bring back the economy from recession to full-employment. However, the principle of completion problem effect is not manifested and the succeeding set where MPC is increased to 0.8 to illustrates a reduction in government spending from $3B to $1B where students will be left to complete a numerical solution from a partial solution because the solutions are worked out completely. The implications are worth noting: first, worked example effect is paramount in a complex learning activity where a combination of verbal and audio codes that include numerical solutions and graphical illustrations may result to cognitive overloading so that following the completion problem effect of completing the rest of the solution can aggravate the situation. Complete solution sets free the learner from the extra task and reduces "split-attention effect" which refers to the reduction of learning when a learner has to divide learning task with another one that reduces attention on the main task.

Moving on, the 'redundancy effect principle' is effective in deepening discussion especially at the beginning where an illustrative graph explaining a recessionary gap of $5B is explained several times, both verbally and visually, so that the learner is guided carefully on where the economy is and where does it want to go which ultimately is to bring it back to full-employment level. Here, the principle of discovery learning (Ausubel, 1961, p.17) where the learner integrates knowledge with existing cognitive structures and discovers new path of knowledge to achieve a desired result through the numerical solutions of relating the multiplier with economic output, is evidently provided through numerical manipulations (increase of MPC from 0.4 to 0.8 to achieve a $5B expansionary stimulus) as seen in the lecture. The application of reception learning (Ausubel, 1962) likewise is evident in such example as increase in government spending to increase AD, is a generally accepted fact. Moreover, rote learning is shown in defining fiscal policy, multiplier, MPC and MPS which require memorization to aid proceeding analysis.

The examples further illustrate the concept of encoding specificity where learners can have as many cues as needed for encoding concepts which they will use for recall later (Thompson & Tulving, 1979; Tulving & Thompson, 1973). This is one strategy that will aid transfer of knowledge from working memory to long-term memory.

On cognitive organization, the lecture presents fiscal policy multiplier as an example of integrated knowledge comprising the cognitive structure (Ausubel, 1963, p.217) being a general knowledge that provides a framework for which subsequent knowledge will be utilized, thus representing the highest hierarchy of organization. An example of an anchoring idea (Ausubel, 1961) from the lecture is expansionary policy on AD as it provides an impetus for new knowledge such as MPC and MPS.

Assimilation Theory (Ausubel et al., 1978, pp. 67-68) as revised from the early version is evident when the topic "Marginal Propensity to Save (MPS)" is discussed because previous knowledge of MPC is integrated into new learning (MPS) as both affect the multiplier level. Another instance of prior knowledge essential in new learning is the portion of the video that illustrates an increase of government expenditure (G) by $3B to further increase AD expansion to $5 as the desired level of output. The mathematical solutions indicate that prior knowledge of the formula and procedure interact with the new information resembling a correlative subsumption as it interacts with the existing idea to change the learner's understanding of it in some way (Ausubel, 1978). Finally, the multimedia presentation in the learning resource is evidently learner-centered as the foregoing principles of multimedia learning design are applied.

2.1 Strengths

One strength of the video is its attainment of a basic implication of Cognitive Information Processing (CIP) which is providing organized instruction as explained by Driscoll (n.d.) The lecture is organized starting with prior knowledge then proceeds with objectives and then to elaborate discussions. There are attention clues present including color highlights, and simultaneous handwritings with verbal narrations as explained in the modality effect. The use of graphical representations illustrating concept relations (Beissner, Jonassen and Grabowski, 1994; see also Jonassem, Beissner, & Yacci, 1993) that expound on AD analysis with price and real GDP as variables enhance cognitive learning as well. Furthermore, the principle of contiguity (Sorden, 2005) is an identifiable strength as the lecture is presented simultaneously with graphical animations as in the case of adjusting AD from recession to full-employment coupled with simultaneous handwritten statements serving as attention clues to indicate temporal contiguity while the presence of spatial contiguity strengthens attention and aids transfer of knowledge as the visual images (graphs and texts) are presented on a page where the concurrent lecture is taking place.

The idea of selective attention on the part of the learner due to the complexity of discussions is addressed by putting emphasis on important instructional aids such as graphical illustrations together with stimulus features add to cognitive learning. Next, the concept of unit structure (Kintsch & van Dijk, 1978) ascertains that emphasis on important points written on separate sentences on bullet points at the end of the lecture indicates attention that learners need to focus on as they serve as the main ideas, rather than embedding them in lengthy paragraphs.

Another strength of the material is the manner of presentation done by starting with general knowledge, for example, fiscal policy as an aggregate economic policy to increase AD and eventually, output. Then elaborate discussions follow in the pursuit of dissecting the multiplier as a factor that will increase AD, and so on. This process is consistent with the Elaboration Theory (Reigeluth, 1979; Reigeluth & Stein, 1983) which was originally conceived by Ausubel as progressive discrimination. In elaborating discussion of the multiplier, several examples are given which according to Tennyson and Cocchiarella (1986) help enhance instruction such as a prototype model where a 0.4 MPC is used to solve for the economy's multiplier then the succeeding examples such as an increase of MPC to 0.8 which indicates a variety of some sort illustrates a feature analysis model of instructional learning. These examples articulate pattern recognition and perception (Driscoll, n.d.) that are important elements of cognitive information processing.

Finally, there are features of the lecture that incorporate prior knowledge, as those previously mentioned, to present learning, attempting to be remembered as mental schema in problem-solving such as in exploring the direct correlation between MPC and the multiplier and the inverse relationship between MPS and multiplier, and expansionary fiscal policy that shifts AD to the right. This organization of ideas will serve as mental models that form the basis for meaningful learning. To this end, it is imperative that learners realize their learning goals and find meanings from the lecture presented so that retrieval of information will not be difficult, assigning propositions for automaticity of learning as the case may be and employing metacognitive skills for optimal realization of learning.

2.2 Weaknesses

An important learning concept associated with the video discussion is the Cognitive Load Theory which explains how users need more cognitive load to acquire, process, and understand the information when the task complexity increases and users are students or novices (Garvey & Gonzalo-Angulo, 2017). Likewise, the theory purports limited capacity to store and process incoming information into a person's working memory (Chandler & Sweller, 1991; Sweller, 1988, 1994). As such, the lecture suffers from cognitive overloading. From the beginning up

to the end, new information is always added and the learner is always 'asked' to focus on every narration and visual presentation. For instance, solving the recessionary gap of $5B presents a complex set of procedures that drains a learner's mind because of several numerical examples coupled with a highly technical, verbal narrative and graphical illustrations to add to cumbersome multitasking. The abundance of extraneous cognitive load as explained by Sweller, Van Merrienboer, and Paas (1998) through the numerical, graphical, textual and narrative methods reduce meaningful learning. In this regard, incidence of forgetting for failure to encode, retrieve and the presence of interference which, according to Driscoll are common explanations may result eventually.

Furthermore, the problem of split-attention occurs when an expansionary AD as indicated in the graph is juxtaposed with a mathematical solution that divides focus, in effect storing information to long-term memory which is a tedious task unless the learner is an advanced student where a graphical image with math aids learning task.

Due to the 'stress' that occurs within the working memory and with minimal use of chunking information, rehearsal and encoding mechanisms (Driscoll, n.d.) that would give some organization and proper allocation of incoming information, except in some instances where elements of the Marginal Rate of Leakage (MRL) and variables such as MPC, MPS and AD are abbreviated for purposes of encoding and chunking information.

Yet another weakness of the lecture is the absence of advance organizers which, According to Ausubel (et al., 1978, pp.171-172) serves to 'bridge the gap between what the learner already knows and what he needs to know before he can meaningfully learn the task at hand." For example, the concept of fiscal policy multiplier which serves as prior knowledge introduced at the beginning can serve as a mental framework with which the learner may use to bridge to incoming information which is the multiplier. Providing a mere definition does not suffice the need because it is only a simple recall procedure without any information as to learner's cognitive awareness of the learning process, or in some sense recognition as Driscoll explains. Advance organizers give a structural organization of learners' prior knowledge that can be used to process incoming information. Thus, learners will be ready to absorb the multiplier discussions readily.

Finally, the absence of metacognition that will allow learners to think about their thinking process and employ self-regulatory skills, strategies to make for deep and meaningful learning weakens the video presentation. A good reason, perhaps, to explain the lack of metacognitive procedures such as devising strategy would be that there is no assessment practice in the lecture so that learners will apply those strategies in problem-solving, or that reflective questioning in some areas of discussion, such as what happens if fiscal policy expansion overshoots the full-employment level? This mode of questioning will elicit critical thinking that assimilates prior learning and present task which tests cognitive function.

3. Implications

Studying economics through a video lecture presentation facilitates optimal learning provided that learners are aware of the underlying concepts, principles, and theories of the discipline. At the core of this is the ability to foreground technological affordance for meaningful learning realization enabling critical thinking skills with minimal disruption amidst technological intervention.

The clear message is this: technology is an aid to learning, it is not to be construed as learning *per se*. Proliferation of digital tools in today's highly globalized village should not cloud the minds of learners with numerous technology- driven tasks that ultimately disrupt the learning process. In such scenario, a mental shift turns learning into entertainment, recurves focus in multiple directions, drains energy as a result of multifarious scenarios happening all at the same time. The mind is capable of performing tasks but clearly when there are too many to accommodate, optimal performance becomes a cumbersome goal to achieve.

In conclusion, technological support manages to deliver functionality provided that users are aware of what is technology's role in the learning process. When internalized well, the focus is on learning and the outcome benefits both students and teachers.

References

Anderson, T. & Dron, J. (2011). Three generations of distance education pedagogy. *International Review of Research in Open and Distance Learning*. Athabasca University, Canada. (vol. 12.3). https://www.researchgate.net/publication/50888829_Three_Generations_of_Distance_Education_Pedagogy

Behlol, M. (2010). Concept of learning. International Journal of Psychological Studies 2(2). DOI: 10.5539/ijps.v2n2p231. https://www.researchgate.net/publication/49591973_Concept_of_Learning

Driscoll, M.P. (n.d.). Cognitive information processing. Learning and Cognition (ch. 3, p. 74-112).

Driscoll, M.P. (n.d.). Meaningful learning and schema theory. Learning and Cognition (ch. 4, p. 113-151). http://jennyleckeythetechie.weebly.com/psychology/module-5-meaningful-learning-schema-theory-situated-cognition

Garvey, A. & Gonzalo-Angulo, J. & Parte, L. (2017). Cognitive load theory: Limiting the gap between academics and students in accounting and auditing. Review of Business and Legal Services. https://www.researchgate.net/publication/319602626_Cognitive_Load_Theory

Mayer, R. & Moreno, R. (n.d.). A learner-centered approach to multimedia explanations: deriving instructional design principles from cognitive Theory.

Molenda, M., Nelson. L.M. & Reigeluth, C. (n.d.). Instructional design. Indiana University, Bloomington, Indiana, USA.

Mayes, T. & Freitas, S., (n.d.). Learning and e-learning: The Role of Theory. https://researchrepository.murdoch.edu.au/id/eprint/27018/

Sorden, S., (2005). A Cognitive approach to instructional design for multimedia learning. *Informing Science Journal.* Northern Arizona University. 2005.