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Autonomous learning - the role of appropriate language and discourse

Introduction and background

The notion of autonomous learning is key to the objectives of the VITALmathsLIC project which *inter alia* produces short video clips specifically designed for the autonomous learning of Mathematics (www.vitalmaths.com). The VITALmathsLIC project is a multilingual collaborative research and development project between the University of Applied Sciences Northwestern Switzerland (FHNW) and Rhodes University in South Africa. As Schäfer (2015) reported the VITALmathsLIC project produces, disseminates and researches silent and multilingual mathematics video clips that aim to expose mathematical ideas and concepts by using every-day material animations, as opposed to computer generated animations, in such a way that it makes these ideas accessible, inspiring, visual and motivating. The use of the growing databank of freely downloadable video clips is underpinned by different imperatives in the two countries. The South African imperative recognises the need for disseminating mathematical ideas to learners and teachers who do not have access to mathematical materials due to the geographical remoteness of their schools, poverty and general state neglect in providing appropriate learning materials and supporting both teachers and learners. The continued production and use of the video clips are informed by a research agenda that critically reflects on the pedagogical and epistemological implications of the individual video clips. Although the project does not necessarily prescribe a particular pedagogical approach, but promotes the autonomous use of the videos, it is interested in how the video clips are used in and out of the classroom. This paper specifically focusses on the notion of autonomous learning within the VITALmathsLIC project and reports on a research study that explored how selected learners in South Africa used some of these video clips outside the confines of the classroom. The main purpose of the study in question was to „ascertain how eleven Grade 10 learnes experience the autonomous use of selected VITALmaths video clips, which incorporated animated manipulatives, in their study of the Pythagorean Theorem and the addition and subtraction of fractions“ (Haywood, 2016).

Theoretical considerations

Broadly speaking autonomous learning is about an individual taking charge of his/her own learning. Haywoord's (2016) study was inspired by Holec (1981) citing Benson and Voller (1997) who described autonomy as:

- situations in which learners study entirely on their own;
- a set of skills which can be learned and applied in self-directed learning;
- learners' taking responsibility for their own learning
- the right of learners to determine the direction of their own learning" (Benson & Voller, 1997, p1).

Learning autonomously is however more nuanced that simply working independently – it is also about the capacity and desire to think for oneself. Thanasoulas (2000, p.4) makes the interesting observation that a person does not simply „become" autonomous, but that autonomoy is a „process [and] not a product". In this process, learners should develop a „meta-cognitive capacity" which is an awareness of their own knowledge and an ability to understand, control and manipulate their own mental processes (St. Louis, 2003). Haywood (2016) cites Sfard's (2007) observation that autonomous learners explore the discourse of others to make the discourse-for-others into a discourse-for-oneself. This resonated strongly with this research study, not only from a theoretical perspective, but also from an empirical perspective and informed the research design significantly. Haywood (2006) writes that a discourse-for-oneself is that which a learner would spontaneously turn to whenever it may assist the learner in solving his/her own problems, whereas a discourse-for-others would be one that is perhaps more formal, has community legitimacy and is accepted. In the context of learning mathematics, Wood (2008) makes the interesting observation that learners continuously engage with a mathematical discourse by ascertaining whether his/her own mathematical discourse/communication/ aligns with that of others who are seen to be proficient in the specific discourse. This corroboration ensures that the learner's discourse is consistent with that of others (a teacher, the text book or another learner). In order for us to start documenting what a discourse-for-oneself might look (sound) like, after being exposed to an autonomous learning situation, Haywood (2016) conducted a research project which asked selected learners to engage on their own with specific VITALmaths video clips in their free time and then reflect on their experience.

Research design

The challenge for the research design was to craft an authentic research environment whereby the participating learners could engage with

mathematical materials in as an autonomous manner as possible, and then for us to capture and analyse their experiences in terms of their adopted discourse-for-oneself. The basic research design consisted of five phases. The initial phases consisted of purposefully selecting 11 Grade 10 learners and familiarising the participants with VITALmaths video clips that were accessed through the VITALmaths.com website. The aim of the subsequent pilot phase of the research design was to download a few video clips onto the mobile phones of the participants. The participants were then asked to engage with the video clips in their free time over a two week period. The participants were then asked to share their experiences in informal dicussions and feedback sessions. The next few phases, the more formal phases of the research project, entailed the participants completing a baseline questionnaire seeking information about the nature of the particpants‘ use of mobile phones and their engagement with mathematics in their free time. The participants were also asked to complete two pre-tests on the mathematical content of the final video clips that were downloaded on their mobile phones. They were then asked to engage with these video clips over a two-week period after which they each presented a formal presentation where they shared their experiences of engaging with the video clips and what they learnt as a result of this experience. They were also required to write two post-tests on the mathematical content of the video clips. There were two mathematical fociis, namely the Pythagoras‘ theorem and operating with fractions. Each participant did two presentations which were all videorised.

Research instruments and analysis

The videos of the presentation were transcribed and analysed in terms of a discourse-for-oneself. The following analytical framework was used to find evidence of:

- Words used – accuracy of articulation of objects
- Visual mediators – use of visual objects and manipulatives
- Endorsed narratives – spoken words that are framed as a description of objects, or relation between objects, or processes with or by objects
- Discursive routines – words used to generalize and justify.

(adapted from Sfard, 2008 and Berger, 2013)

Through this analysis it was then possible to obtain an overall picture of the extent to which the participants adopted a discourse-for-oneself as a result of interacting with the said video clips as illustrated in the Table below.

Comparison of how the learners were classified according to their mathematical discourse and hence as an autonomous learner						
Pythagorean Theorem			Learner	Fraction work		
Completely	Partially	Not at all		Completely	Partially	Not at all
■			1	■		
	■		2		■	
	■		3		■	
	■		4		■	
	■		5		■	
■			6	■		
■			7	■		
■			8	■		
	■		9		■	
	■		10		■	
	■		11		■	

Conclusion

Autonomous learning is a process of transforming a discourse-for-others into a discourse-for-oneself. This study showed that engaging with VITALmaths video clips in an autonomous manner does faciliate this transformation to a degree.

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