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Seeking the best blend for deep learning in a flipped classroom – viewing student perceptions through the Community of Inquiry lens

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Abstract

We describe a case study of a third-year undergraduate class in Enterprise Education. A blended learning design in the form of a flipped classroom with a duration of one semester, was explored in two cohorts. The question was to explore how students experienced the flipped class for learning and how this approach presented the different presences in the Community of Inquiry (CoI), and its revisions. The online learning components represented the individual learning space, where the main resource was bespoke videos that replaced lectures and complemented the textbook and other learning material. The classroom hosted a business school-style seminar where students in small groups engaged in solving a new business case study, going through phases of developing a concept to presenting the group solutions to the class. It aimed at fostering active learning both inside and outside the class. Students participated in the activities to apply the theory in new cases. The teacher facilitated the sessions, provided direction and correction as needed. The research used mixed methods consisting of trace data, quantitative and qualitative student feedback to explore how suitable the flipped classroom in undergraduate education was towards developing deep learning. The online individual learning space yielded highly salient Teaching Presences, accompanied by evidence of Agency Presence, characterised by independent activity and personal learning preferences. Online videos and ICT resources helped with understanding the theory ahead of class meetings. Seminars in the collaborative space fostered deep learning of the theory, and enabled students to apply the prepared theory in case studies and solve problems. Integration and particularly Resolution in Cognitive Presence of CoI featured in the seminars, while Social Presence was the weakest. Suggestions are made to implement the flipped class principles in an online class.

Keywords: Higher education, Flipped classroom, Video, Seminar, Community of Inquiry, Deep learning, Enterprise education, Case studies

Introduction

While traditional lecturing still constitutes the primary teaching activity in South African higher education (Ng'ambi, Brown, Bozalek, Gachago, & Wood, 2016), it is seriously being reconsidered as an effective learning space (Garrison & Kanuka, 2004) because active classes have been shown to produce better learning outcomes (Freeman et al., 2014). Those active pedagogies (among others) include group problem-solving, tutorials, peer

instruction, and studio or workshops in class time (Freeman et al., 2014; Milman, 2012). However, in a parallel development, blended learning (BL) has evolved from integrating face-to-face experiences with text-based, and web-delivered activities (Garrison & Kanuka, 2004) to a combination of on-line and face-to-face experiences that support each other, without the online component being exclusively text-based communication (Ginns & Ellis, 2007). Recently, the definition has become more fluid, embracing videoconferencing, podcasting, YouTube videos, wikis, blogs, and other media (Picciano, 2009).

In spite of these developments, media do not necessarily determine the success of the learning environment, but from an engaging, collaborative, and constructivist approach resonates with best-practice learning design. While BL requires using the "best" affordances from online and face-to-face learning (Picciano, 2009), adequate instructional support should be provided in order to uncover the transformative power of BL (Garrison & Kanuka, 2004). Results from a large meta-analysis conducted in the United States (US) showed that students in BL perform better, have less attrition, and are more satisfied than with traditional classrooms (Means, Toyama, Murphy, Bakia, & Jones, 2009). Asarta and Schmidt (2017) furthermore found in their class that prior academic achievement influenced student performance in blended learning. Those in the lower third of grade distribution performed better in traditional classrooms, while the highest-performing third performed better in the blended classrooms with flipped instruction. The design of BL can involve multiple components, determined by the subject domain and the institutional context. Therefore teachers should strive to discover the optimal configuration of their classes in order to maximise benefits from the blend.

In a related development and relevant to the previous discussion, Herrington's (2006) design principles for authentic learning focus on engagement in the instructional environment. In HE (higher education), creating authentic learning environments within brick and mortar classrooms is not always feasible. However, replicating this environment online can contribute authentic context to a course. Over the past 15 years, the inverted or flipped classroom (FC) that was originally applied in school contexts (Sams & Bergmann, 2013), has become popular in HE. Active learning classrooms, BL and FC are known to support student learning outcomes (Baepler, Walker, & Driessen, 2014). Flipped classrooms reportedly foster active learning both inside and outside the class, enabling students to take ownership of their learning (Jones & Iredale, 2010). Conversely however, O'Flaherty and Phillips (2015) found that when students are highly satisfied with FC, there is little evidence that the modality is more effective than traditional lectures. Abeysekera and Dawson (2015) argue that this instructional arrangement is under-researched and that empirical evidence about its efficacy is lacking in education. HE domains where aspects of the FC has been researched are as diverse as design (Roehl, Reddy, & Shannon, 2013), engineering (Mason, Shuman, & Cook, 2013) and health sciences (McNally et al., 2017). The largest corpus of research and publications on flipped classrooms currently fall outside the peer reviewed and accredited scholarship (Abeysekera & Dawson, 2015), while including some excellent conference papers. While the bulk of research focuses on video-delivered lectures, little is published on the activities and pedagogy of the contact sessions.

In this study we report on designing and teaching a third-year course with 30 students enrolled in education for Enterprise in the Economics faculty at a large contact university in South Africa. The initiative focused on preparing students for working in entrepreneurial concerns. The FC approach, including bespoke content videos for independent study,

prepared students for in-class seminars that followed a Harvard-style case-study method, using formative and continuing assessment as evidence of learning. The study uses a pragmatic approach to investigate student perspective about learning in a flipped classroom. We used mixed methods, based on trace data of student engagement in the Bb Learn course management systems (CMS), accompanied by student-reported data from separate sets of closed and open-ended questions for the two main components of the FC – the latter analysed qualitatively. The Community of Inquiry (CoI) framework for BL and its revisions informed interpretation of the resultant themes. Primarily the findings showed that the videos contributed to the mastery of the theory, representing a strong Teaching Presence in the online components. Online technology in the individual space was inspiring and fostered independent, self-directed learning, corresponding with both the Emotional (Cleveland-Innes & Campbell, 2012) and Learning Presences (Shea & Bidjerano, 2012). While the seminars improved understanding of the theory, their main value lay in understanding how to apply the principles in real business cases. The seminars displayed social and teaching presence, with evidence of all phases of the practical inquiry model on which cognitive presence is based. The methodological contribution is that the combination of learner trace data and qualitative information provide insight into how students engage in flipped classrooms.

In the literature section, we outline the subject, highlight the limitations of traditional classrooms, outline the CoI and describe the advent of BL flipped classrooms. We summarise practical aspects of video lectures and seminars and formulate the research questions. In the content section, we describe the context, design and delivery of the course. Next, we describe the mixed-methods research approach and data collection. In the next section, we present the findings as they pertained to each component of the class, and discuss, triangulate and compare findings as they unfold. In conclusion, we answer the research questions and propose how FC approaches can be applied and extended into different technology-dependent blends.

Literature overview

Entrepreneurship and enterprise education

The academic and practice field of enterprise and entrepreneurship education is booming at all levels (Fayolle, 2013; Moberg, 2014). The teaching challenge, however, is to foster deep-level learning and understanding of the field according to Bloom's taxonomy (Krathwohl, 2002), that moves past the mere recall and comprehension of theory, and towards application of theory and analysis of problems in businesses. Students need to be more exposed to real-world experiences, bringing together theoretical knowledge and application. This may require practitioners to synthesise novel solutions and evaluate those solutions. Case-study teaching, a popular pedagogical approach in the disciplines of business, engineering and medicine, is a way of engaging the student with authentic workplace problems; it thus follows a problem-based pedagogy. Where direct immersive learning in a real workplace is not possible, contact universities are limited to conducting education *about* and *for* enterprise (Jamieson, 1984). This paper explores an educational approach that may bridge the gap between theory and application in an HE for Enterprise course.

The limitations of traditional classrooms

While traditional lecturing may be more effective at transmitting information than supporting development of skills, values or personal development (Abeysekera & Dawson, 2015). the value is contested if it represents a teacher-centred pedagogy (Ash, 2012; Bishop & Verleger, 2013; Breivik, 2015; Freeman et al., 2014; Kellogg, 2013; Sams & Bergmann, 2013). Teacher-centred pedagogies which lack engagement or interaction, often result in students' adopting a passive attitude to learning whilst encountering focus difficulties (Kellogg, 2013), and not taking responsibility for their own learning (Freeman et al., 2014). Moreover, the limited interaction causes difficulties for lecturers to differentiate pacing and instruction that adapt to the different progress levels of students (Goodwin & Miller, 2013).

However, *active learning* in undergraduate classes has been shown in some disciplines to yield significant learning gains in comparison to traditional lecturing (Freeman et al., 2014; Goodwin & Miller, 2013; Tucker, 2012). Active learning is fundamentally a learner-centered environment that encompasses interactivity. It is, thus, imperative that teaching preparations and activities are well organised to optimise class time, with frequent opportunities for questions, discussions and formative feedback. Meaningful learning activities, such as developing problem-solving skills, critical higher-order thinking, and application of knowledge, representing the kind of skills needed in practice, also require interaction among students (Bates, 2015; Breivik, 2015; Sams & Bergmann, 2013). Experiential learning and learner-centred interactive education are based on asking, not telling (Freeman et al., 2014). While the success of in-class activities hinges on the quality of pre-class preparation (Abeysekera & Dawson, 2015; Milman, 2012), students seldom read from textbooks for homework (Kellogg, 2013). Jovanović, Gašević, Dawson, Pardo, and Mirriahi (2017) found that students in FCs who use a strategic approach to learning that includes a focus on reading materials in preparing for class attain the highest performance. Students who participated least in activities, including reading, also obtained the weakest results. Due to the great diversity of HE students in South Africa, a lack of language and reading skills is a known barrier (Bharuthram, 2012). Providing learning material in different formats might support such students (Picciano, 2009).

Meaningful learning activities, such as developing problem-solving skills, critical higher-order thinking, and application of knowledge, representing the kind of skills needed in practice, also require interaction among students (Bates, 2015; Breivik, 2015; Sams & Bergmann, 2013). However, since experiential learning and learner-centred interactive education are based on asking, not telling (Freeman et al., 2014), the success of in-class activities hinges on the quality of the students' pre-class preparation (Abeysekera & Dawson, 2015; Milman, 2012), and students seldom read from textbooks for homework (Kellogg, 2013). Jovanović et al. (2017) found that students in FCs who use a strategic approach to learning, that includes a focus on reading materials in preparing for class attain the highest performance. Students who participated least in activities, including reading, also obtained the weakest results. Due to the great diversity of HE students in South Africa, a lack of language and reading skills is a known barrier (Bharuthram, 2012). Providing learning material in different formats might support such students (Picciano, 2009).

Community of Inquiry

With the advent of online learning replacing traditional distance learning, higher education institutions are increasingly offering online classes and programmes in addition to traditional teaching. The adoption of computer-mediated communication created a virtual text-based environment, where students can learn collaboratively. Networked interaction needs to support the development of active, self-regulated and reflective learners (Shea & Bidjerano, 2010). With the aim of improving the learning experience and outcomes of online learners, researchers identified the factors that contributed to successful online studies. The CoI framework brought the core elements together in a concise framework as a guide to design, evaluate and research online learning environments that foster text-based constructivist learning (Anderson, 2016; Garrison, Anderson, & Archer, 1999). Development of a validated questionnaire propagated the use and importance of the essential intersecting three-presence framework, consisting of Social, Teaching and Cognitive Presences, that represented all the important activities in an educational experience (Garrison, Anderson, & Archer, 2001, 2010).

Social Presence, is "the ability of learners to project their personal characteristics into the community of inquiry, thereby presenting themselves as 'real people'" (Garrison, Cleveland-Innes, & Vaughan, 2001). Social Presence is evident through three indicators: *affect*, *open communication* and *group cohesion*. The expression of *affect*, often through emoticons, is linked to task motivation and persistence. Affect in the guise of humour and self-disclosure decreases social distance, which brings people together and facilitates critical thinking. *Open communication* consists of respectful discourse and recognition. *Group cohesion* builds a sense of group commitment. Together all these dialogues contribute to knowledge construction (Garrison et al., 1999).

Teaching Presence is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes" (Garrison et al., 2001). It consists of three categories of activities, including *design and organisation*, *facilitating discourse* and *direct instruction*. The first includes planning and setting the curriculum, organising the learning space and resources, assessment. *Direct instruction* includes presenting questions, explaining, providing constructive feedback, summarising ideas and providing content knowledge from diverse resources (Garrison et al., 1999). *Facilitation* consists of sharing meaning, focusing the discussion and identifying areas of agreement and disagreement. Student participants in the CoI class can also contribute to this presence by virtue of sharing the discourse and facilitation. With Social Presence, Teaching Presence supports Cognitive Presence, fundamental to success in HE.

Cognitive Presence is "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication." (Garrison et al., 2001). Cognitive Presence is based on the Practical Inquiry model (Garrison et al., 1999). The cyclical practical inquiry model follows four events, namely a *triggering event*, characterised by a sense of puzzlement, followed by collaborative *exploration* and information exchange in different media, after which students engage in *integration*, where they connect and defend those ideas. Finally, the *resolution* phase is reached, where the initial problem is solved, the solution is practised and new ideas can be applied in practice to other problems or outside their study environment (Garrison et al., 1999, 2001).

While the three aforementioned presences are richly nuanced and intersect with one another, they are situated in the subject context, the characteristics of the learners and the technology. Later revisions of the CoI suggested the inclusion of other presences in the original scheme.

Learner Presence (Shea & Bidjerano, 2010) was the first addition to articulate the role of the online learner, particularly with regard to *self-efficacy* measures. These authors suggest that online learner *self-regulation* would be supported by and expand the descriptive power of the CoI, as Learner Presence shows a strong association with all three CoI presences. Shea and Bidjerano (2012) postulated that Cognitive Presence was a function of learner self-regulated learning (SRL), which becomes more important to compensate for low levels of Teaching Presence, in either online or blended learning. Exploring the relationships between die CoI, self-efficacy and effort in blended and online environments, Shea and Bidjerano (2012) show a stronger relationship between Teaching Presence and self-efficacy in BL than in online learning. The critique of this approach is that it violates the CoI premise wherein participants can be both learners and teachers (Garrison in Anderson (2016)).

Emotional Presence was coined by Cleveland-Innes and Campbell (2012) as a possible fourth construct in the CoI framework, defined as "the outward expression of *emotion, affect*, and *feeling* by individuals and among individuals in a Community of Inquiry, as they relate to and interact with the learning technology, course content, learners, and the instructor". Emotion plays a critical role in learning and teaching (Rienties & Rivers, 2014), due to its influencing learner *motivation, self-regulation* and academic *achievement*. It is, thus, evident that Emotional Presence is closely related to Social and Teaching Presence. Moreover, the six-question instrument developed by Cleveland-Innes and Campbell (2012) measures emotional responses in online discourse with other students, the instructor, technology and the course. Clearly, emotion's influence on learning is undisputed, in all contexts, including online learning. Whether it should be added to the CoI as a separate presence is debatable. In the Anderson blog (Anderson, 2016), Randy Garrison rightly notes that emotions are inherently pervasive in learning, and act differently on all presences depending on the context, and recommends that this presence needs to be explored.

Metacognition is described as an intellectual skill that plays a critical role in learning. Garrison and Akyol (2015) developed a metacognition construct for CoI. It explores individual *self-regulation* and *personal reflection* and how that can be developed into a co-regulation of shared metacognition. The process is described as interplay between awareness and management of own knowledge through deliberate strategies. Garrison and Akyol (2015) propose that interpersonal social communication inhibits Cognitive Presence, while purposeful scholarly discourse enhances it. There are no indicators as to how it can manifest in BL.

Agency Presence, coined by Anderson (2016) as an addition to the CoI, encompasses cognitive theory (Bandura, 1982) and many elements of Emotional Presence and Learner Presence. He reasons that learners have the power to act and are responsible for *self-regulated learning*. The fact that the original CoI framework makes allowance for students to step into "teaching" activities, as they help shape the discourse leading to higher-order understanding and learning (Garrison et al., 1999), prompts the question of whether the CoI needs an additional presence, as it

aims to address the *core* educational experience. Exogenous variables like technology, subject and student levels already form the broader context; some of these proposed additions might find a home there. Otherwise many of the proposed additions could be incorporated into the original framework without distorting the core structure (Anderson, 2016). We would also suggest refinement of the intersecting areas of presences to accommodate coding constructs that correspond partially with any of the classic presences. All four additional presences mentioned here contain the elements of self-regulation, motivation and learning strategies, and they might 1 day converge into a single new presence, or be relegated to the exogenous variables. It is not the aim of this paper to contribute to that debate. We will mainly refer to the more widely published Learner and Emotional presences, particularly the latter, on the grounds that emotion influences learner motivation, self-regulation and achievement.

Blended learning While e-learning is changing the face of higher education, its variations are complicating research and development. A common set of terms and definitions of online and blended learning compiled for the Online Learning Consortium (Mayadas & Miller, 2014) is an attempt to classify most of the varieties. These definitions simplify the institutional take on online and blended learning in terms of geographical accessibility. Blending online and contact teaching and learning to achieve better outcomes and harness the power of the blend is not as easy as coining a definition. "Blended learning is an integration of face-to-face and online learning experiences – not a layering of one on top of the other" (Garrison & Kanuka, 2004), which would result in excessive workloads (Vaughan, 2010). Blended learning combines "online and contact activities needed to support each other in achieving the desired learning outcomes" (Ginns & Ellis, 2007). Vaughan (2010) provides some useful pointers to designing a blended learning environment: a reflective combination of asynchronous and synchronous discourse; flexibility and freedom in the online learning, combined with expert guidance in a purposeful face-to-face environment. Atef (2015) calls for more learner-centred learning and reshaping of teacher and learner roles while Picciano (2009) proposes replacing about one out of three lessons with media-rich online activities. However, Vaughan, Cleveland-Innes, and Garrison (2013) caution against reducing class time without good reason.

Allen, Seaman, and Garrett (2007) reported in a meta-analysis of empirical studies that blended courses the same promise as online programmes. Means et al. (2009), in another meta-analysis, reported that students in BL conditions performed better than those in face-to-face conditions, with higher gains than in pure online courses. They attributed the benefits to additional instructional elements and learning time. Picciano (2009) further advocates the use of BL as it is beneficial for diverse learners with different learning styles, preferences, talents and personalities, and stresses the suitability of different delivery modes for diverse learning domains. Open distance and e-learning courses with a focus on student support can also produce superior success rates (Tait, 2015). Nevertheless, when BL does not produce significantly better outcomes, students in a business domain course clearly preferred a hybrid/blended course above a traditional one (Marquis & Ghosh, 2017).

With the enormous uptake of blended learning in traditional higher education, the need arose to adapt the framework for planning different blended environments.

Flipped classroom

BL emphasises integrating the strengths of activities from the two main delivery modes. One way of implementing BL is by means of flipping the classroom. Sams and Bergmann (2013) popularised the use of the flipped or inverted school classroom, particularly in the sciences, by replacing traditional lectures with home-viewed online videos and doing homework in class. A necessary feature of the classroom flip is extensive use of web-based technology to deliver course content outside of class, with active learning during class time (Strayer, 2007). HE disciplines where FC has been implemented include Biology, Education, English Language, Engineering, Computer Science, Humanities, Nursing and Social Studies (Baepler et al., 2014; Bishop & Verleger, 2013; Enfield, 2013; Hung, 2015; Kim, Kim, Khera, & Getman, 2014; McNally et al., 2017; Roehl et al., 2013). Despite Milman (2012) stating that flipped classes may not be suitable for English Second-language students, McNally et al. (2017) reported that English Additional-language students strongly preferred flipped classes. This preference was due to self-directed learning and context provided in the videos, the ability to revisit the lecture, and material explained in different ways by peers in the collaborative space. SonicFoundry (Center for Digital Education, 2013) reported high adopters of flipped classrooms in HE Business and Economics faculties. Nevertheless, there is little published research on the benefits of BL or FC in this domain, and particularly in enterprise education (Arbaugh, Desai, Rau, & Sridhar, 2010).

In his blog, Bergmann (2016) reframed flipping according to contact learning activities in *group spaces* and "homework" in *individual learning spaces,* rather than being confined to class or home. "Group space is defined as when students are face to face with their instructor. Individual space is defined as when students are working independently" (Bergmann, 2016). We adhere to the limited definition of a flipped classroom, where video lectures and technology are provided for outside-class learning, while application and problem-solving activities are provided in class (Bishop & Verleger, 2013; Strayer, 2007).

Flipped classrooms are more democratic and student-centred than traditional teaching, as learner autonomy, student-teacher contact, student interactions and engagement improve (Garrison & Cleveland-Innes, 2005; Kellogg, 2013). Students feel in control of their learning as they follow their own pace (Breivik, 2015; Li, Zhang, Bonk, & Guo, 2015). Abeysekera and Dawson (2015) provide evidence that flipped classrooms improve student motivation and support learning by limiting the cognitive load, thereby enabling better mastery and retention of learning (Center for Digital Education, 2013) Well-executed flipped classrooms that are structured and organised lead to better learning outcomes than traditional lectures due to independent learning and critical thinking (Breivik, 2015; Kellogg, 2013). Improving the quality of teaching and learning in a flipped classroom requires redesign and hard work (Tucker, 2012). Subsequently, teachers are challenged by the cost and time needed to prepare content, professional development and shifting to a student-centred pedagogy (Center for Digital Education, 2013; Dodds, 2015; Israel, 2015). Innovative educational technologies incorporated into traditional classes may suffer, being "interesting only because they are novel and

may lose their appeal as learners become accustomed to them" (Keller & Suzuki, 2004). Dodds (2015), however, reasons that the novelty effect alone cannot be responsible for the success of the flipped classroom.

Learning in the individual space – Videos and web-based resources Class-delivered lectures can be successfully replaced by rich media formats including videos, podcasts of lectures, online presentations or interactive content or online tutorials, and are effective in instructing large amounts of conceptual content (Herreid & Schiller, 2013; O'Flaherty & Phillips, 2015). Video lectures can allow self-paced learning and provide effective overviews or illustrative examples showcasing diverse situations and cases (Breivik, 2015). They can be aimed at particular knowledge points or known problematic concepts and problems and include real-world problems (Herreid & Schiller, 2013).

Students reported the following benefits of videos over live lectures: taking notes from video lectures were convenient, as they need not miss content while writing; some students found it easier to focus attention on videos than in a live class. Most students watched videos at suitable times and re-watched them to prepare for exams, eventually spending more time on the subject than otherwise (Breivik, 2015). Being able to view the video multiple times, as well as pause and rewind, helped students to understand content, particularly those who struggled with the language (Sams & Bergmann, 2013), while others preferred listening to the subject being "talked" (Breivik, 2015). Video also provides alternative representations of information, accommodating diverse learners who prefer visuals, audio or text (Picciano, 2009; Sams & Bergmann, 2013). Distributed flipped classes incorporating massive online open courses (MOOCs) open new possibilities for providing online content resources like videos and assignments, if they run concurrently with the campus courses (Israel, 2015).

Flipped classrooms, however, may fail due to monotonous and impersonal video lectures that can inevitably lead to loss of interest and poor class attendance. Videos that represent technology-delivered lectures that merely aim at transmitting content, compare poorly with well-planned interactive lectures. Videos can also be overrated as a teaching tool if students are unable to view videos due to unavailability of computers and internet (Roehl et al., 2013). Thus, the format of the wide variety of self-paced preclass materials and activities employed in different contexts was less important than making sure students really accessed those materials. In addition, teachers also find it challenging to source suitable videos, in spite of copious online offerings (Ash, 2012). However, the most important component in an FC was engaging students in the face-to-face component (O'Flaherty & Phillips, 2015). Teachers of flipped classrooms agree that instructional videos on their own do not improve teaching; it depends on how they are integrated into an overall approach (Li et al., 2015; Sams & Bergmann, 2013; Tucker, 2012). A well-integrated approach may disseminate students' attitudes towards flipping which are sometimes negative due to perceptions of a higher workload or a lack of cohesion between in-class and out-of-class work. Yet, creating high quality videos is both expensive and time-consuming (O'Flaherty & Phillips, 2015). In order to create clear and engaging videos that can be reused, enough time should go into addressing technical issues and proper editing to eliminate errors, repetition and pauses (Enfield, 2013; Herreid & Schiller, 2013). Breivik (2015) found positive learning

outcomes using videos with an average duration of seven to 12 min, while Sams and Bergmann (2013) recommend 10 to 15 min. Furthermore, in a scoping review, O'Flaherty and Phillips (2015) found that students and lecturers often prefer FC over traditional classes, though there is only indirect evidence of improved performance. Israel (2015) suggests that students do not perform worse in distributed FC with MOOCs. The format of the wide variety of self-paced pre-class materials and activities employed in different contexts was less important than making sure students really accessed those materials. However, the most important component in an FC was engaging students in the face-to-face component (O'Flaherty & Phillips, 2015).

Learning in the collaborative space - seminars Literature about flipped learning emphasises that the classroom component should not be lectures, but consist of active, student-centred collaborative tasks allowing students to complete tasks at higher-order cognitive levels (Abeysekera & Dawson, 2015; Herreid & Schiller, 2013; Milman, 2012; Sams & Bergmann, 2013). Application, active learning, peer learning in informal small groups, cooperative student projects and problem solving can be effective in the collaborative space (Abeysekera & Dawson, 2015; Roehl et al., 2013).

Bergmann (2016) and McNally et al. (2017) promote a collaborative space with learning facilitation, where high-quality interaction with the lecturer can take place (Garrison & Cleveland-Innes, 2005; Roehl et al., 2013), including real-time feedback (Goodwin & Miller, 2013). In activities based on a constructivist pedagogy, students discuss, analyse and solve problems, and apply their knowledge in new contexts (Bishop & Verleger, 2013; Kellogg, 2013). Successfully flipped classrooms integrate the activities in the classroom with the concepts and content in the videos (Kim et al., 2014; Roehl et al., 2013). Submission of a short assignment or doing a quiz before the session ensures adequate preparation (Abeysekera & Dawson, 2015; Kim et al., 2014; McNally et al., 2017; Milman, 2012; Roehl et al., 2013). This assessment gauges understanding and informs the subsequent events. Activities are led by tasks that are designed to help students understand an important concept or frame the discussion of real-world problems (Abeysekera & Dawson, 2015; Herreid & Schiller, 2013), and are followed by feedback (Kim et al., 2014). Distributed Flip students strongly preferred feedback and interaction with instructors and peers above the MOOCs, while instructors in such courses did not use the MOOC's summative assessments, preferring the on-campus counterparts (Israel, 2015).

Different formats of interactive, student-centred classes are used in HE. A seminar can be defined as a group meeting characterised by active student participation (Bates, 2015). While the teacher is responsible for the design of the group experience, such as choosing topics and assigning tasks to individual students, independent student preparation is crucial (Oxford Learning Institute, 2017). Seminars work best in small groups and are more often found at graduate level or the last year of undergraduate programmes (Bates, 2015). They are flexible enough to be offered both in class and online. The seminar approach can be used to create purposive instructor-student interaction, akin to action-based teaching. Moberg (2014) proposes action-based methods for teaching enterprise skills, consisting of working in groups, where active participation, discussion and debate in class are encouraged, while practical application of previously

learnt theory takes place. Peer instruction has been shown to be beneficial in student-centred environments, where the teacher can engage and guide students instead of providing the explanations, spending more time with individual students who need attention, while allowing stronger students the freedom to learn independently (Abeysekera & Dawson, 2015). Facilitation requires the experienced lecturer to guide rather than teach (Kavanagh, Reidsema, McCredden, & Smith, 2017; McNally et al., 2017).

Case studies Popular in post-graduate programmes, the case-study method usually replaces the historical order of teaching theory first and then applying theory in practice, and depends upon learning from mistakes (White, Gandhi, Gorod, Ireland, & Sauser, 2013). The teacher becomes a facilitator of the student-led discussion, which can accommodate up to 80 students (Harvard Business School, 2018, 2016). The Harvard Business School (HBS) case-study method first presents students with a case as a problem in which they have to adopt the role of decision maker. From the case description, they identify the problem, perform the necessary analyses and formulate their recommendations. Students then discuss these with their classmates, exchange perspectives, defend their points and build on each other's ideas. Students typically do 85% of the talking in the HBS Case method, while the professor is a facilitator that steers the discussion in a Socratic fashion (Bates, 2015; Harvard Business School, 2016).

The classroom meetings in this research had characteristics in common with both the seminars described and the Harvard case-study method. They will henceforth be called seminars, albeit a specialised form thereof. We carefully combined elements of proven methodologies originating from more junior educational levels, like flipped classrooms, with those from postgraduate teaching, like case-study methodology. In such a way a student-centred learning environment could be created that cemented the theoretical foundations and bridged those to actual practice-based problems.

Research is needed on which types of active learning are efficient in certain topics and contexts, and how lecturer activities and behaviour can benefit students (Freeman et al., 2014). This research explored the students' perceived value of both individual and collaborative activities of an FC. The research question was: How could a flipped classroom approach make the best use of the online and contact-learning modes while bridging the gap between theory and application in a senior undergraduate course?

The sub-questions were:

- How did the flipped classroom contribute to learning?
- How did the CoI presences manifest in a flipped classroom?

Context

The course and students

The study was performed in a third-year BCom Entrepreneurship course in the faculty of Economic and Management Sciences at a large contact university in South Africa. Thirty students enrolled annually for the campus-based course, spanning 14 weeks, which was facilitated and managed in English by a senior lecturer. A circa 20% of students in this course had English as a home language. The university promotes a culture of blended learning, as lecturers supplement normal lectures with online content,

formative assessment and other activities on Blackboard Learn ™ (Bb), the course management system (CMS) in use at the university. There is also a drive towards a blended replacement mode with reduced classroom time (Twigg, 2003) and using the CMS more creatively, as advocated by Bates (2015). Cohort 1 were the first students in this subject participating in an FC in 2015, and the research was initially undertaken to explore the delivery mode. The FC has been repeated in subsequent years, while data were also collected in 2017 (called cohort 2), and are presented here, to confirm and clarify the initial findings.

Design and delivery

The traditional face-to-face lectures were replaced with a flipped approach for 6 weeks. However, considering that many students do not have computers or internet at home, one of the 3 weekly classes of 50 min in this period was replaced with online learning according to the blended learning design proposed by Picciano (2009). This slot on the timetable allowed for self-study which included viewing the online videos and downloading the other online material using campus internet, harnessing the ample student computers available on campus in the library and computer labs, as well as unlimited free internet on campus. Students could alternatively download the material on their smart phones using the Blackboard Student ™ application. Two adjacent class slots provided sufficient contact time for seminar activities aimed at theory application. The third component of the semester course consisted of a group project, where students collaboratively researched a given topic and created artefacts for assessment. (Workplace readiness was a high priority and each cohort completed a different kind of group project, which is not discussed in this paper. Other resources or activities that differed from year to year are not discussed either).

Educational technology -videos and slides: Pre-class activity The theoretical content in the curriculum was professionally scripted and recorded in six videos, representing the six topics that correspond to the ten chapters in the textbook, shown in Table 1. They portrayed the lecturer outlining the topic, explaining the concepts in the topic with the help of PowerPoint slides, graphs and relevant visual material that were cut into view. Additional examples from the business world illustrated new concepts in order to elucidate the textbook. The reason for creating the bespoke videos was that

Table 1 Number of video views recorded in YouTube– cohort 1

Video	Topic	No of chapters covered	Duration in minutes	You Tube views	You Tube time watched in hours
1	The model for business growth	1	6:14	105	8
2	Dynamics of growth	1	6:48	79	7
3	Managing the venture life cycle	1	13:26	81	13
4	Growth strategies and methods	2	11:43	83	10
5	Business turnaround	2	15:33	83	14
6	Financing growth	3	14:44	70	12

the textbook examples were mostly outdated, featuring businesses that are unfamiliar to our students, or had lost relevance. Another benefit of the videos was that they could be used in different courses, including those for postgraduate students needing revision and updating of pre-knowledge. Videos were published as unlisted content in YouTube, and then shared by embedding the links in Bb. The accompanying PowerPoint slide handouts were uploaded into Bb and released simultaneously with the videos. The video links were activated a week before the corresponding seminar on each topic to provide students ample time to familiarise themselves with the content in all the resources. The duration of the videos was between approximately 6 to 15 min, depending on the topic. While there were no online discussions during this time, students often e-mailed questions to the lecturer, who communicated in class and via Bb announcements or in a social media group.

Contact sessions: in-class activity The philosophy of Sams and Bergmann (2013) informed the design of the seminars: "Flipped learning is … about how to best use the in-class time with students". The critical importance of the classroom component for this course was to design activities that addressed student-centred active learning (Bishop & Verleger, 2013), in order to bridge theory and application. The practical inquiry model aimed at furthering deep cognitive learning (Akyol & Garrison, 2011). In the flipped approach, students attended class to do the case-study application on the topics they had to study individually. As in the Harvard case method, preparation for interactive sessions was indispensable. Each seminar started with students writing a class test on the pre-class content to make sure they had studied the textbook or online resources. Students who were not prepared were unable to answer the questions could not contribute to the subsequent group discussions and could not pose questions or clarify misunderstandings during discussions and reflection. After the first seminar, all students arrived suitably prepared for the class. Seminars then provided the opportunity to facilitate the analysis of case studies of on-going businesses. A seminar consisted of three parts:

Reading the provided case study and individually answering the questions. After completing the test, the students received a new one-to-three-page case study of a continuing business with questions to read and answers to initially formulate individually. The written answers were taken in for correction and assessment. This short-written assessment verified students' preparedness and prevented students from falling behind. The new case study and questions present the triggering event in the practical inquiry, followed by individual exploration and "jumping to conclusions" typical of this phase.

Forming groups to discuss and present the best answer for one of the questions. Students formed ten groups of three; each group received one of the questions they had already answered on their own to analyse and agree on the best possible answer. This resulted in three groups of students refining and answering the same question. Each group had the opportunity to present their answers to all their peers, which resulted in a class discussion of the presented answers. The class thus engaged in the Integration phase of the inquiry model, testing and defending their answers, until they reached consensus.

A reflective session facilitated by the lecturer on the presented answers as well as clarification of concepts or uncertainties. The last part of the session was used to reflect on the answers shared with the class, where the facilitator could fill in gaps in interpretation and

clarify any misconceptions. In a blended practical inquiry, direct instruction is often required at this stage to help the process forward (Vaughan et al., 2013). This phase would culminate in the resolution phase of the practical inquiry cycle, the final section in Cognitive Presence, as students formulated a solution to a real-world business problem that might be applicable to similar business cases.

Research methodology

A pragmatic approach, relying primarily on qualitative methods (Anderson & Shattuck, 2012), was taken to describe a case study relying mostly on self-reported data to help explore *how* students learned in an FC. This contributed to an educational research project based on sound practical and theoretical principles, that could promote student engagement through innovative learning tasks (Anderson & Shattuck, 2012; Herrington & Reeves, 2011). In the first cohort participating in the FC, a complete data set was obtained from all 30 students after completing the course, using a paper-based questionnaire. The questionnaire contained scaled items and open-ended feedback to supplement the items. In order to ascertain that the observed benefits of the FC were not caused by the novelty effect (Keller & Suzuki, 2004), and to confirm CoI findings, data were also gathered from the second cohort, using a modified version of the itemised questionnaire that incorporated constructs uncovered in the first cohort. The web-based questionnaire that Cohort 2 (consisting of 30 students) received after classes stopped, yielded fewer responses (13) than the first cohort, due to their examination date in this subject moving forward at their request. Qualitative and quantitative data from open-ended and itemised questions were analysed and crystallised with trace data from the Bb CMS (both cohorts) and YouTube (only first cohort). Rich descriptions of the context and FC teaching methods, which were similar in both cohorts, are given. All students consented to our using their data for improvement of future teaching. Using this epistemological stance, the research was not experimental; consisted of two small student cohorts with no control groups, and cannot be generalised to larger populations.

Bb traced and reported the number of times each student opened the respective online content areas on all dates of the semester, from which we summarised hits for both cohorts in Fig. 1, particularly the video and slide folders. The number of hits each unlisted video received was captured during the first cohort's semester from the YouTube website (Table 1). Only enrolled students had access to those links. During cohort 2's semester, the videos were linked to other courses as well and could not be traced in YouTube to this class. The *number* of hits in the CMS video folder is indicated on the timeline of course events for both cohorts (Fig. 2). As this subject achieved high completion and pass rates over many years, and no correlations were found between student grades and online activity; further exploration of the grades were not performed.

Anonymous paper-based feedback provided by the students in the two cohorts at the end of their semester provided further data. Cohort 1 received two questionnaires on which to rate given characteristics of videos and tutorials respectively, using a 3-point scale, (0 for *Not Important*, 1 for *To some extent Important* and 2 for *Very Important*). We calculated an *Importance score* for each statement by adding the ratings and dividing the sum by 2 (the maximum value), and then dividing it by the number of responses in the cohort, with the result expressed as a

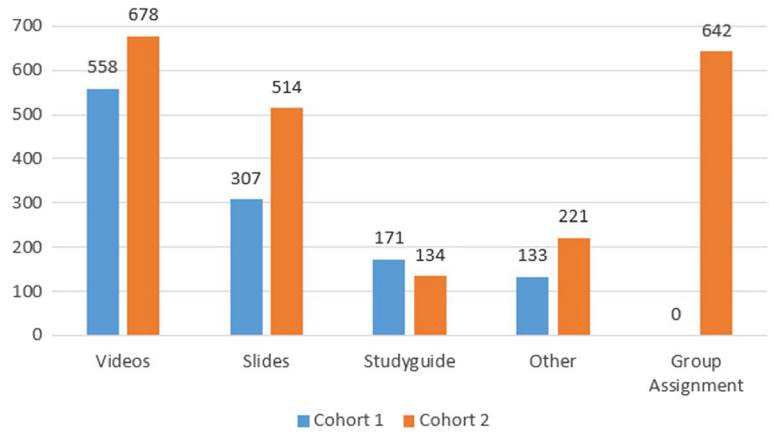

Fig. 1 Number of hits in all Bb content areas in both cohorts

percentage. Statements were sorted from high to low according to this value, shown in Tables 2 and 4.

Cohort 1's reflections in the open-ended questions were transcribed electronically and coded thematically, using computer-based qualitative analysis software, ATLAS.ti™, and a data-driven approach (Saldaña, 2013) to generate codes and families. Using an inductive approach, we grouped codes together that represented themes that pertained to learning activities. Both authors coded all data independently and consolidated findings afterwards. There was more than 90% correspondence between the two coders. The second author re-coded the open-ended responses deductively, informed by the CoI framework, and grouped codes into CoI presences.

Cohort 2 received a new itemised questionnaire (Additional file 1) that retained the highly rated items from cohort 1's first questionnaire, consolidating closely related

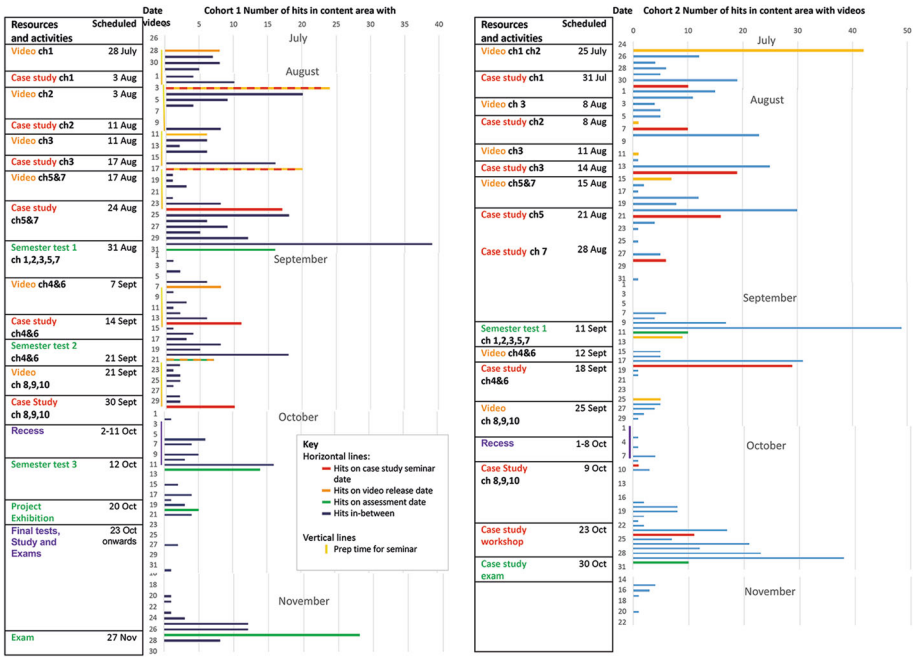

Fig. 2 The total number of hits on the Bb Video area on the academic timeline in both cohorts

Table 2 Students' rating importance of statements on videos: cohort 2 findings in brackets

Given statements	Not important (0)	To some extent important (1)	Very important (2)	Importance score %
Having another resource in addition to the textbook	0	7 (1)	23 (12)	88 (96)
View again to understand better	0	9 (2)	21 (11)	85 (92)
View again for revision	1	8 (3)	21 (10)	83 (88)
View again for deeper understanding	2	8 (5)	20 (8)	80 (81)

items, with new questions formulated to capture the themes from the qualitative analysis. Questions were grouped to represent CoI presences. Thirteen students from cohort 2 (30 students) completed this questionnaire electronically, representing a 43% response rate, that might be skewed. Findings from cohort 2 are compared with those of cohort 1.

Findings and discussion

Findings on educational technology

We first discuss the importance of the online videos and slides within the bigger picture of online resources in the CMS, as gathered from Bb.

Figure 1 shows that the heaviest traffic was evident in the course folder containing the video links, with 558 and 678 hits by the respective cohorts, while the slides folder was opened 307 and 514 times by the two cohorts. The detailed CMS tracing data over time (not shown) indicated that slide hits were consecutive with the video hits and all students accessed each of the nine slide shows in the week after becoming available. The online study guide was viewed 171 and 134 times, while additional information on course activities had 133 and 221 hits respectively. Only cohort 2 had a web-based group assignment and that attracted 642 hits. Views of the CMS announcements were not recorded in Bb as they were delivered to students' email. Videos plus slides accounted for the majority of the Bb hits. Video therefore represented the most viewed educational technology component of the flipped classroom in both cohorts. The abundance of hits in the video and slide folders justified the reduction in classroom time in favour of independent online study, and meets the requirement (O'Flaherty & Phillips, 2015) that students had to access and download the online material. The increase in hits in cohort 2, who had more previous exposure to BL, refutes the possibility of a transient novelty effect in the FC. There was enormous variation between individual students' accesses of the video folder in Bb. Some students accessed each video link once and others multiple times. We found no correlation between student grades and video access behaviour, suggesting that it was a personalised activity that reflected students' individual learning preferences, within their personal circumstances.

While Bb provided a comprehensive report of all hits per student in the video folder, with times, it did not indicate *which* videos were viewed on specific dates, or duration of being watched. YouTube recorded the hits per video, in total 501 (Table 1), indicating that about 10% of the visits to the video folder in Bb (total of 558, Fig. 1) did not culminate in viewing a video. As the more ICT-savvy students could have known how to download videos for later off-line viewing, actual views might have been more. The first video was possibly a novelty, as shown by 105 hits (by 30 students) in YouTube.

Thereafter views levelled off, as on average each student viewed each video online between two and three times. The total viewing time displayed in YouTube per video (Table 1) was less than expected if every view was complete from beginning to end, suggesting selective repeat viewing.

The relative numbers of hits in the video folder in Bb are henceforth discussed as representing video viewing patterns. The YouTube hits from cohort 2 were not obtained because the same videos were also used in other courses as revision material. Bb trace data in both cohorts indicated that the dates and frequency of accessing videos and slides were practically identical, suggesting that they were studied together. We will henceforth refer to videos only, as representing the online learning resources.

Not having access to computers or internet is a known barrier in flipped classrooms (Milman, 2012). If each student viewed a video at least once, we met the goal as lecture replacement. Multiple views represent repeated voluntary engagement with the material that would not be possible with standard lectures, and indicate the motivational value of the videos. Bb reports provided the number of hits on the video area on all dates. The spikes in daily views in relation to important learning events in the course in both cohorts are shown in Fig. 2. Hits on the day a video was released are shown in orange, the seminar day in red and summative assessment day in green. In tracing cohort 1, it seemed that the video folders gathered roughly equal hits immediately upon release (in orange) and during the rest of the week preceding the seminar; many during the last day or the hours before the seminars (indicated in red). As new videos were released on the same date as the seminar class for cohort 1, that day's hits represent both the previous video (viewed by some before class) and the next video released after the seminar. For the second cohort, we aimed to unravel the video viewing pattern, and therefore changed the release of new videos to the day *after* the seminar. Tracing data showed that consistently high numbers of preparatory video views took place on the day before seminars, with a few views just before class, as students were not allowed to watch any video *during* the seminar. Due to a campus timetable moving on with a day around 8 August, cohort 2's second seminar took place on the day when a new video was released. Otherwise, viewing patterns were similar between the two cohorts. Views increased during the days before the semester tests, even during the recess in cohort 1, and again before the final exam (assessment dates shown in green, in Fig. 2). The highest number of views in a single day occurred on the day before the first semester test, in both cohorts. The second highest activity was seen before the final exam, also in both cohorts. As both cohorts had the same number of students (30), hits can be compared directly, showing that cohort 2 viewed videos and slides more times on important dates than cohort 1 (Figs. 1 and 2).

Figure 2 suggested that the videos (and the accompanying slides) played a large role in preparing for seminar classes and formal assessment, preparatory and revision activities, which would not be possible if the content were transmitted in traditional lectures. Students viewed videos when it suited them. We address first the *quantitative responses to statements on videos* and then qualitative reflections on how they contributed to learning. Findings from the two analysis methods will be integrated to address the emerging themes.

The quantitative questionnaire ratings of the videos reflected how students used them as a learning aid, with most of the students rating each as *very important*, as seen in

Table 2. The order of importance was the same in the smaller sample from cohort 2. This suggested that the textbook alone was insufficient for mastering the theoretical knowledge. Repeat viewing further indicated that videos also improved on lectures, where an explanation was heard only once, benefitting students with language challenges. Viewing patterns (Fig. 2) confirmed student reports (Table 2) of multiple viewing, and all three reasons for viewing: understanding, revision and insight. This rating confirms that video was important to understanding the theory and that repeat viewing contributed to such understanding.

While Table 2 indicated the known benefits of videos as part of a flipped learning approach, students also reflected on their learning with videos in an open question, mentioning *other* unique characteristics as well as additional benefits that contributed to learning, represented by the themes shown in Table 3.

The original Community of Inquiry presences coincided largely with two of the themes, as shown in brackets next to the original themes, while the third theme indicated self-directed learning, which is central in two additional presences of the CoI framework.

Strictly speaking, all "learning and curriculum objects" created by the teacher resort under Teaching Presence and the Instructional design and management category (Anderson, Rourke, Garrison, & Archer, 2001). The usefulness of the resource sometimes classifies it differently. The most salient theme relating to video corresponded to Teaching Presence: direct instruction. It related to improving understanding and mastering theory, with 42 quotes (Table 3). Twenty-one students mentioned understanding the content better by watching the videos, but also developing a deeper understanding of the concepts. The videos explained the theories and elaborated them further, using new cases: "[videos] answered all the questions that may have arisen from a textbook". The *explaining* theme

Table 3 Qualitative analysis of reflection and feedback on videos (cohort 1) and Importance scores on related items (cohort 2)

Theme with codes	Number of codes cohort 1	Importance score % cohort 2
Improve understanding, mastering theory (Teaching Presence Direct instruction) total	42	90
Helped to understand content[a]	21	85
Helped learning, deeper understanding, clearing misunderstandings	12	92.3
Explained and elaborated	9	88.5
Resource unique characteristics added value: (Teaching Presence: Design & organisation) total	38	93
Provided summaries, outlines	13	96.3
Indicated what was important	12	96.2
Supplemental resource, better than textbook[a]	10	96
Audio easier to understand, better than lectures	3	92.3
Students' own learning preference, strategy (Learner and Emotional presence) total	25	94
Repetition in own time and easy memorisation	13	92.3
Independent learning	7	96
View video with other resources	4	92
Do not like reading	1	

[a]These 2 themes overlap with statements rated in Table 2

confirms the quantitative findings (Table 2), that the most important reason to view a video again was for this purpose. These findings illustrate the fact that instructional lectures featuring large amounts of conceptual content can translate successfully to rich media formats such as videos, particularly entry-level content at the lower end of Bloom's taxonomy (Sams & Bergmann, 2013), that progressed to deeper learning through repetition. Using practical real business-world examples helped to illustrate and elucidate the theory. This theme is testament to the lecturer's knowledge of both subject and students, and anticipating where they would need supplemental material or examples. The lecturer did not interact online except sending announcements, but maintained an online Teaching Presence through prior creation of the resources.

Unique characteristics of videos were coded 38 times and represent the Instructional Design and Management aspects of Teaching Presence. The teacher provided a resource that added value that was not provided by a standard lecture, by clearly highlighting important aspects. Summaries and outlines helped organise content for learning. Video was a useful additional resource, with better examples than in the book. Similar to students elsewhere (Breivik, 2015), some understood the content by listening to the subject being "talked". This is particularly true for students who struggle with the language (McNally et al., 2017; Sams & Bergmann, 2013).

The most prominent affordances or *unique characteristics* (Bates, 2015) of video, like being able to view multiple times, pause and rewind, (seen in Table 2), corresponded to those described in the literature. Videos supplemented other resources (Sams & Bergmann, 2013). It is known that it is not educational technology per se that helps students to learn, but different representations of content, better explanation using visual, audio, diagrammatic and pictorial resources accommodating diverse learners who prefer visuals, audio or text (Picciano, 2009; Sams & Bergmann, 2013), often used simultaneously and in an integrated way. Videos supported students' preferred learning strategies; some explicitly mentioned how video resonated with their individual learning preferences (25 quotes), suggesting a learner-centred pedagogy (Table 3). These included repetition: "[I] could pause, take notes and watch again; in a normal lecture you cannot do that". Some quotes indicate more learning that is independent: "Studying in a more personal way outside the classroom." Trace data also showed that practically everybody deliberately viewed the videos to prepare for the seminars and assessments. Many students preferred multiple representations that helped them connect and integrate concepts. They viewed video together with the other resources like textbook, online slides, tables and diagrams: "I could see the tables and diagrams while I was listening and make connections." Some students preferred videos as they simply do not like reading, which might be a culturally linked phenomenon (Bharuthram, 2012).

Items based on the themes in Table 3 and completed by cohort 2 using the same three-point scale as in the other itemised questionnaire showed similar salience for items representing Teaching presence, and Emotional or Learner presence. These findings also crystallise the quantitative data from Bb (Table 2), showing that videos were viewed more than once, for understanding the theory, revision and seeking deeper insight. Findings also confirm the literature on how video lectures fit in with students' preferred learning strategies. Breivik reported that students liked the flexibility of video lectures, watching at convenient times while they found it easier to maintain attention than in class. Students have more autonomy in a flipped classroom, feel in control of their learning as they follow their own pace (Breivik, 2015; Li et al., 2015). Students are aided with different levels of pre-knowledge

(Goodwin & Miller, 2013), allowing repeated viewing as needed to develop competence. Videos in the place of live lectures moved the responsibility for learning to students and increased their sense of independence in the construction of their own knowledge. Such independence is reported to increase learning and intrinsic motivation (Abeysekera & Dawson, 2015; Arbaugh et al., 2009).

Students used affective language in connection with these characteristics, indicating Emotional Presence (Cleveland-Innes & Campbell, 2012) regarding the technology. The student preference theme also corresponded with facets of the Learner Presence (Anderson, 2016; Shea & Bidjerano, 2012), as they showed deliberate actions of engaging with the materials in ways they liked and preferred, that differed from attending lectures, or just studying from a text. Strategic (and successful) learners use multiple resources and self-directed learning (Jovanović et al., 2017) that corresponds with this theme. One could argue that Teaching Presence: Design enabled these activities through the online artefacts designed by the teachers (Anderson et al., 2001). Vaughan et al. (2013) also employ Teaching Presence to encourage students to assume greater responsibility and control of their learning experience in BL. Though students were required to prepare for imminent sessions with assessments (videos representing Teaching Presence), students also worked independently (when and where it was convenient), showing volition, displaying self-directed learning and learning strategies, culminating in Emotional Presence.

Absence of negative feedback about the videos suggested that this course avoided the common pitfalls in video teaching, justifying the time and effort required for proper planning and professional production of resources. Videos as integrated supplemental resource could be accessed anywhere and any place. Student engagement with the video content during the semester and before assessment, as seen in the timeline and reported revision, possibly helped students prepare for exams.

Findings regarding seminar activities

We discuss first how the given statements relating to seminars were rated, then the qualitative analysis of the additional student feedback grouped into themes.

Most ratings of given characteristics of the seminars (Table 4) were close in importance. The top two statements related to mastering theory, suggesting that, even after learning the theory with the help of videos and other resources, students valued further engagement and clarification from the facilitator. Bb (Fig. 2) showed that students engaged with the theoretical content in the resources in preparation for the seminars, confirming dependence on the theoretical basis. The next two rated statements related to application, while the last three addressed the skills needed in the workplace. *Opportunities to communicate clearly* was less important in the seminar for a number of cohort 1 students, indicating a failure to foster Social Presence in the seminars, which is a limitation of an FC. The facilitator indicated that a shortage of time did not allow every one of 30 students an opportunity to speak. Communication skills only featured pertinently in the group projects in both cohorts (not part of FC, findings not given). Asterisks indicate where the rating of the cohorts differed, with cohort 2 rating *Learn to think critically* ** particularly lower, and *Problem solving** and *Repetition** rated somewhat lower. With such small numbers, limited conclusions regarding the difference between the cohorts are possible.

Table 4 Students rating importance of seminar statements (cohort 2 values in brackets)

Statement	Not important (0)	To some extent important (1)	Very important(2)	Importance score %
Another opportunity to engage with content (repetition)	(1)	7 (5)	23 (7)	88 (73)[a]
Answer aspects you did not understand (clarification, understanding)	(1)	7 (2)	23 (10)	88 (85)
Link to theory & real world	1	6 (5)	23 (8)	86 (81)
Learn to think critically	(1)	10 (7)	20 (5)	83 (65)[b]
Solve problems	1 (1)	10 (4)	19 (8)	80 (76)[a]
Opportunity to communicate clearly	5	10	15	66

[a]Note that cohort 2 rated these statements lower than cohort 1
[b]Note that this was the lowest rating in cohort 2

Table 5 shows the themes derived from coding through the CoI lens with sample codes, obtained from cohort 1, and importance scores for related items from cohort 2.

Qualitative feedback on the seminars shows that collaborative learning took place, suggesting that the practical inquiry cycle was completed in some groups in each seminar, even though not all students commented as such. The most important contribution of the seminars (with 27 quotes) was the application of theory to practice, through applying theoretical concepts in cases of familiar businesses. Students recognised the theoretical models underpinning the subject in existing business. This aspect represents the resolution phase of the practical inquiry model in the Cognitive Presence, confirmed by quantitative ratings of the seminars (Table 4). The second most salient theme pointed towards the Integration phase of Cognitive Presence (14 codes), where understanding was at a deeper and more applied level than that resulting from the videos. Connecting their ideas of theoretical proposals to a real live business helped students understand the domain better. Exploration, the second step in Cognitive Presence, was implied as students learnt from different perspectives. Formative feedback from the facilitator clarified student thinking, while the teacher skilfully facilitated discussions in the groups, representing Teaching Presence (5 codes) that also included direct instruction. Two students specifically said that they enjoyed interacting with peers, and how this class engaged everybody; some of the interaction in the cognitive cycle was mediated by peers, and implies some measure of Social Presence.

Table 5 Qualitative feedback and importance scores on seminars

Theme	Codes	Number of codes $n = 52$ cohort 1	Importance score % cohort 2
Cognitive Presence: Resolution	How applied in practice, real business, practical	27	76.9
Cognitive Presence: Integration	Understand theory, businesses, theory to practice, examples	14	84.6
Cognitive Presence: Exploration	Interaction with whole class, learnt from other perspectives, brain storming	5	73.1
Teaching Presence: Facilitation/Direct instruction	Lecturer clarified, organised, guided, structured thinking	5	84.6
Social Presence: Open communication, group cohesion	Engaged whole class, interaction with everybody	2	57.7

Cohort 2 rated statements indicating Teaching and Cognitive Presences highly, with Social Presence much lower, as also seen in the low salience in the first cohort. From these findings, neither components of the FC contributed much towards Social Presence. The lecturer afterwards explained that the group dynamics in cohort 2 required her to limit student participation in order to progress towards the answers. Too little student participation in the seminar might be a characteristic of seminars with relatively large classes, an observation that warrants further exploration.

We confirm that many students prefer doing interactive activities in class over lectures or MOOCs (Bishop & Verleger, 2013; Israel, 2015), because they solve problems and apply their knowledge in new contexts (Kellogg, 2013). Discussing the theory and cases with peers on their level fostered better understanding of the concepts, a benefit of active learning. Vaughan (2010) proposed that the triggering event of practical inquiry could be a proposal for developing a solution. The new case study presented in a seminar would have that function. The first individual and group solutions would represent the exploration phase, leading to a group solution, where discussions integrated loose theories and concepts, presenting the integration phase in practical inquiry. Similar to Vaughan's process of presenting a developed artefact to the bigger group, the students presented their solution to the class, while the facilitator contributed to the discussion, moving to integration and resolution. Vaughan et al. (2013) express the importance of collaborative, constructivist practices in BL. These findings confirm that critical thinking and higher-order learning are rooted in dialogue (Bates, 2015), in this case face-to-face dialogue.

Feedback in Table 5 shows that many students benefited from repeated engagement with theory in the seminar, progressing to deeper understanding. The value of formative feedback by the facilitator that rectified misunderstandings and facilitated the discussions is seen in Teaching Presence. The high saliency of these findings suggests that providing only lectures, or video recordings of lectures, risks leaving students behind with cognitive gaps and misunderstandings if they cannot ask questions (Milman, 2012). The success of working in groups to solve problem cases indicated that everybody had a sufficient theoretical base from which to contribute meaningfully to the discussion (Abeysekera & Dawson, 2015).

The FC provided students with multiple resources, with representations and opportunities to engage with complex or abstract theory that improved and progressively deepened their understanding with each new representation, from video to seminar, and encouraged learning strategies that would lead to better learning outcomes (Jovanović et al., 2017). While interaction in HE is expensive for all stakeholders (Miyazoe & Anderson, 2015), the exploration of teaching models that seek to achieve a better economy of scale than a traditional classroom could be prudent. Applying interaction equivalency theory (Miyazoe & Anderson, 2015) on an FC shows that if Student-Content interaction with videos is of high quality, effective learning might ensue. On the other side, production of high-quality videos is also expensive (Israel, 2015).

In the seminar, high-quality and quantity interaction was evident between student and student, postulated to lead to higher satisfaction. The Emotional and Learning presence we observed in the video section would suggest that optimal quantities of time spent in the individual learning space of the FC could also contribute to student satisfaction.

Moore (1997) proposes that distance education benefits from a reduction in transactional distance, described as the psychological and communications space between student and teacher. Transactional distance is reduced with more dialogue, and when the learning space is more flexible and the student has more autonomy. The provision of structure through Teaching Presence needs to be carefully balanced by providing enough flexibility and choice. Deci, Koestner, and Ryan (2001) propose that intrinsic motivation in students can be facilitated by developing more "interesting learning activities, to provide more choice, and to ensure that tasks are optimally challenging" (Deci et al., 2001).

The seminars resulted in a deep approach to learning (Krathwohl, 2002) that, according to (Bates, 2015 # 3.4.1), required "a prior intrinsic interest in the subject"; such interest was possibly cultivated or strengthened by the videos. This interest could be associated with the triggering event of the CoI. Such learning flourishes with in-class discussions, problem-solving and stimulation of critical thinking (Sams & Bergmann, 2013). The benefits of using multiple, well-constructed case studies are recognised by the management schools (Harvard Business School, 2016), and seem to be beneficial at undergraduate level as well.

The seminar presents the platform *par excellence* for applying theory to practice, even at undergraduate level, fostering higher levels of application than in videos, as the seminar activities complemented the learning from the videos. The sustained importance of theory in all levels of learning suggests an interplay between low-level learning from videos, progressing through repetition, several engagement opportunities and application (deep learning) in the seminars. The student trace data suggest the role of videos in preparing for seminars, by fostering independent self-paced learning known to motivate students (Abeysekera & Dawson, 2015). On a sobering note, one has to note that the quality of deep learning and CP depends on the quality of facilitation in the seminar, mediated by Social Presence. This was absent in the individual learning, and lower than the other presences in the seminars. The second cohort had decreased interaction, lower critical-thinking and problem-solving skills, as the result of an increase in lecturing activities in the seminar (direct communication with lecturer), due to insufficient time and capacity for facilitation.

Conclusions

How did the flipped classroom contribute to learning?

In reply to the first research question, we conclude that some of the unique characteristics of the educational videos contributed to learning. That these resources were integrated, organised the theory, highlighted what was important, provided summaries, supplemented the textbook with explanations and illustrated through relevant examples are the result of Teaching Presence, in the instructional design and organisation function. The videos helped students to understand the theory better, operationalised through viewing multiple times. They also supported preparation for the seminars and revision for assessment. Videos supported personalised, independent study. The seminars in the collaborative space, which were structured around real and familiar business case studies, and depended upon student engagement and active participation, contributed to the flipped classroom through application and bridging the theory to known business cases. In seminars, domain-contingent cases were solved in a practical inquiry process, with the ultimate resolution in the Cognitive Presence, the activity that had the most value for the students. Seminars continued to deepen

the theoretical knowledge, and ensured that students engaged with the subject matter on a weekly basis through self-study, problem solving, and collaborative negotiation of solutions.

How did the CoI presences manifest in a flipped classroom?

The online individual learning space of this FC does not represent an online CoI, as it is not collaborative or interactive. Figure 3 (developed by the authors) shows the classic Community of Inquiry presences in solid circles, with the findings from this study symbolised in dashed lines, within the two learning spaces. The differences in diameter in the two types of circles indicate areas for improvement. The FC presents as complementary and integrated phases of the same classroom. Different parts of Teaching Presence inform learning in both the individual and collaborative spaces. Social Presence and Cognitive Presence were present in the collaborative space, resulting in productive completion of higher order learning, suggested by completion of the practical inquiry cycle to culminate in resolution. Videos and online resources in the individual learning space were associated with strong Teaching Presence. The individual learning space is not a neglected and lonely space, due to the motivational power of self-regulated, self-efficient learning activities and time management, represented by Learner and Emotional presences, augmented by the emotional value of engaging and interesting presentations of content as videos. The most salient contribution of the seminars was Cognitive and Teaching Presence, with some Social Presence implied, confirming the importance of constructivist pedagogy to achieve deep applied learning.

How could a flipped classroom approach make best use of the online and contact learning modes while bridging the gap between theory and application in a senior undergraduate course?

These findings show that an FC needs to become more of a collaborative and social learning space, particularly if the contact time is limited or the class large. The individual learning space could be supported by providing an online discussion area for each video, where students can post summaries of the video, or questions they have regarding the theory. Student-compiled summaries and explanations could augment those compiled by the lecturer. As the complexity of the subject defies singular applications, this could be a valuable forum in which to share initial ideas, using the business examples in the video, and posting questions. The lecturer could provide answers to such

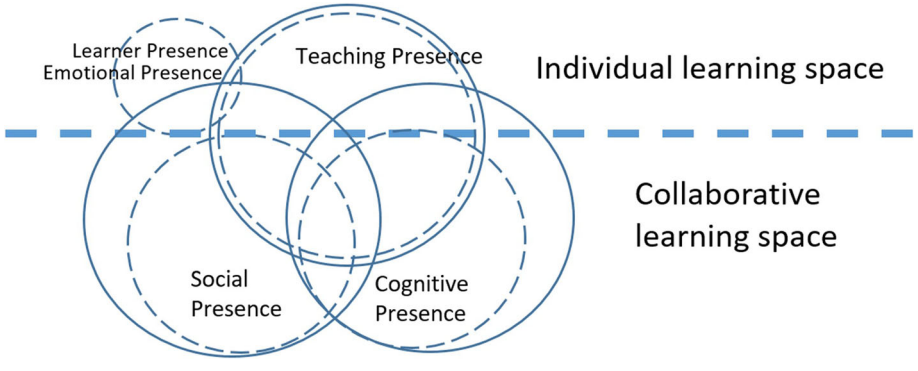

Fig. 3 Distribution of CoI presences in the Flipped classroom (dashed lines) compared with the classic CoI (solid lines)

questions in the forum. Emotional/Learner presences would be fostered in the collaborative spaces through sharing learning experiences and the underlying emotions.

The videos could be enhanced by embedding questions at strategic points to be answered on the spot before continuing. Software to add different formats of questions with feedback, as well as enabling student feedback at the end of the video, could contribute to the learning value of the videos.

The FC can also be adapted as a blueprint for designing online courses, or BL with less contact time or large classes. Contact time can be more productive by doing the initial test online. The triggering event could be provided online to students in small groups, who could complete the exploration phase in asynchronous discussion, allowing them individually to search and contribute resources to the group. Online discussion forums require skilful facilitation, as students would otherwise, as in MOOCs, participate poorly (Israel, 2015). Integration and Resolution could be achieved using video conferencing for online students, or in a reduced-time classroom seminar. The Integration needs to be facilitated by the teacher. Repeating the alternating individual activities built around videos and collaborative activities based on case-study application would retain the unique contributions of both phases. Exploring CoI presences in such an expanded FC might provide a more balanced distribution of presences.

Contributions of this research, limitations and future recommendations

The role of a facilitator rather than a lecturer is a relatively new concept in flipped classrooms. The importance of facilitation and not teaching in the contact time was shown.

The most important contribution of this article is the reassurance that more in-class time can be devoted to practice, to good effect, without losing learning quality. Students were more engaged due to the activities in class, not because it was an FC. This research identified benefits of the individual and collaborative elements of a flipped classroom at senior HE level. These elements were compiled into a first prototype objective instrument to measure those characteristics, included as addendum. Such an instrument would be useful for evaluating and comparing the quality of flipped courses at senior HE level and informing future redesign, extending existing design principles into the business domain.

Regarding the Community of Inquiry, this research makes a small-scale contribution to the study of self-directed learning in BL in HE, by exploring the interplay of the presences in a typical HE FC, as a possible new line of inquiry (Shea & Bidjerano, 2012). It might add to the understanding of a fourth presence related to the CoI, as Emotional Presence seemed to contribute to the motivational aspects of the online videos. The CoI also shows up the limitations of an FC, particularly if that forms the core of the course delivery. The CoI informs us on how FC teaching can be improved to provide a better learning experience.

Limitations of this study include the inadequate tracing data available in a CMS that does not show in detail how the students interacted with the videos. Therefore, the data are almost exclusively self-reported. The small scale of the study is also a limitation, as a larger class could have completed the CoI questionnaire to have a more complete view on the CoI presences.

Additional file

Additional file 1: Flipped class 2017 questionnaire. (DOCX 15 kb)

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Authors' contributions
IleR Planned and taught the course and participated with the professional video team in creating the videos. IleR provided and wrote the subject domain perspective. IleR participated in compiling the questionnaires, gathered, transcribed and analysed the qualitative questionnaire data. LN designed the Bb instructional interface, gathered the electronic data from Bb and the survey platform, collaborated in compiling questions and analysed data. Her main contribution was the discussion of technology in education and CoI perspectives. Both authors read and approved the final manuscript.

Ethics approval and consent to participate
The first author obtained consent from all students to participate, and ethics approval from the Faculty of Economics and Management Sciences Ethics Committee, University of Pretoria, to conduct the research.

Consent for publication
Both authors provide consent for publication.

Competing interests
The authors declare that they have no competing interests.

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References

Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. *Higher Education Research & Development*, *34*(1), 1–14.

Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, *42*(2), 233–250. https://doi.org/10.1111/j.1467-8535.2009.01029.x.

Allen, E., Seaman, J., & Garrett, R. (2007). *Blending in: The extent and promise of blended education in the United States*. Needham: Sloan Consortium.

Anderson, T. (2016). A fourth presence for the Community of Inquiry model? Retrieved from https://virtualcanuck.ca/2016/01/04/a-fourth-presence-for-the-community-of-inquiry-model/. Accessed 8 Dec 2017.

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2), 1–17.

Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational Researcher*, *41*(1), 16–25. https://doi.org/10.3102/0013189x11428813.

Arbaugh, J. B., Desai, A., Rau, B., & Sridhar, B. S. (2010). A review of research on online and blended learning in the management disciplines: 1994-2009. *Organisation Management Journal*, *7*(1), 39–55.

Arbaugh, J. B., Godfrey, M. R., Johnson, M., Pollack, B. L., Niendolf, B., & Wrench, W. (2009). Research in online and blended learning in the business disciplines: Key findings and possible future directions. *Internet and Higher Education*, *12*, 71–87.

Asarta, C. J., & Schmidt, J. R. (2017). Comparing student performance in blended and traditional courses: Does prior academic achievement matter? *The Internet and Higher Education*, *32*, 29–38. https://doi.org/10.1016/j.iheduc.2016.08.002.

Ash, K. (2012). Educators evaluate 'flipped classrooms'. *Education Week*, *32*(2), s6–s8.

Atef, A. (2015). Flipped learning: The gateway to learner autonomy. In *EDEN conference: Expanding learning scenarios - opening out the educational landscape, Barcelona*, (pp. 474–482).

Baepler, P., Walker, J. D., & Driessen, M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers & Education*, *78*, 227–236. https://doi.org/10.1016/j.compedu.2014.06.006.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*(2), 122–147. https://doi.org/10.1037/0003-066X.37.2.122.

Bates, A. W. (2015). Teaching in a digital age: Guidelines for teaching and learning. In T. Bates (Ed.), *Online learning and distance education resources*.

Bergmann, J. (2016). Reframing the flipped learning discussion. Blog Retrieved from http://www.jonbergmann.com/reframing-the-flipped-learning-discussion/. Accessed 30 July 2017.

Bharuthram, S. (2012). Making a case for the teaching of reading across the curriculum in higher education. *South African Journal of Education*, *32*(2), 205–214.
Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. In *120th ASEE Annual Conference & Exposition, Atlanta,* Paper ID #6219. American Society for Engineering Education
Breivik, J. (2015). Student voices: Innovative pedagogical models for course design. In *EDEN conference: Expanding learning scenarios - opening out the educational langscape, Barcelona*, (pp. 513–520). The European Distance and E-learning network.
Center for Digital Education (2013). Flipped classroom adoption survey findings. http://www.sonicfoundry.com/wp-content/uploads/imports/flippedclassroomsontherise.pdf. Accessed 18 Febuary 2018.
Cleveland-Innes, M., & Campbell, P. (2012). Emotional presence, learning, and the online learning environment. *The International Review of Research in Open and Distributed Learning*, *13*(4), 269–292.
Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research*, *71*(1), 1–27.
Dodds, M. (2015). Evidence for the flipped classroom in STEM. *PGCAP* University of York. https://www-users.cs.york.ac.uk/~miked/publications/flipped_classroom.dodds.pdf. Accessed 3 Feb 2018.
Enfield, J. (2013). Looking at the impact of the flipped classroom model of instruction on undergraduate multimedia students at CSUN. *TechTrends*, *57*(6), 14–27.
Fayolle, A. (2013). Personal views on the future of entrepreneurship education. *Entrepreneurship & Regional Development*, *25*(7-8), 692–701. https://doi.org/10.1080/08985626.2013.821318.
Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., et al. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, *111*(23), 8410–8415.
Garrison, D. R., & Akyol, Z. (2015). Toward the development of a metacognition construct for communities of inquiry. *The Internet and Higher Education*, *24*, 66–71.
Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *Internet and Higher Education*, *2*(2-3), 87–105.
Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *The American Journal of Distance Education*, *15*(1), 7–23.
Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *Internet and Higher Education*, (13)1-2, 5–9.
Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, *19*(3), 133–148. https://doi.org/10.1207/s15389286ajde1903_2.
Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. The American Journal of Distance Education, 15(1), 7-23.
Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, *7*(2), 95–105.
Ginns, P., & Ellis, R. (2007). Quality in blended learning: Exploring therelationships between on-line and face-to-face teaching and learning. *The Internet and Higher Education*, *10*(1), 53–64.
Goodwin, B., & Miller, K. (2013). Evidence on flipped classrooms is still coming in. *Educational Leadership*, *70*(6), 78.
Harvard Business School (2018). Perspectives on the case method. http://www.hbs.edu/teaching/inside-hbs/. Accessed 28 July 2016.
Harvard Business School (2016). The HBS case method. www.hbs.edu/mba/academic-experience/Pages/the-hbs-case-method.aspx. Accessed 26 July 2016.
Herreid, C. F., & Schiller, N. A. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching*, *42*(5), 62–66.
Herrington, J. (2006). Authentic e-learning in higher education: Design principles for authentic learning environments and tasks. In *World conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (ELEARN) 2006, Hawaii*, (pp. 3164–3173).
Herrington, J., & Reeves, T. C. (2011). Using design principles to improve pedagogical practice and promote student engagement. In P. S. G. Williams, N. Brown, & B. Cleland (Eds.), *ascilite 2011-changing demands, changing directions, Tasmania*, (pp. 594–601). ascilite.
Hung, H.-T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, *28*(1), 81–96. https://doi.org/10.1080/09588221.2014.967701.
Israel, M. J. (2015). Effectiveness of integrating MOOCs in traditional classrooms for undergraduate students. *The International Review of Research in Open and Distributed Learning*, *16*(5). https://doi.org/10.19173/irrodl.v16i5.2222.
Jamieson, I. (1984). Schools and enterprise. In A. G. Watts, & P. Moran (Eds.), *Education for Enterprise*, (pp. 19–27). Cambridge: CRAC.
Jones, B., & Iredale, N. (2010). Enterprise education as pedagogy. *Education + Training*, *52*(1), 7–19.
Jovanović, J., Gašević, D., Dawson, S., Pardo, A., & Mirriahi, N. (2017). Learning analytics to unveil learning strategies in a flipped classroom. *The Internet and Higher Education*, *33*, 74–85. https://doi.org/10.1016/j.iheduc.2017.02.001.
Kavanagh, L., Reidsema, C., McCredden, J., & Smith, N. (2017). Design considerations. In C. Reidsema, L. Kavanagh, R. Hadgraft, & N. Smith (Eds.), *The flipped classroom - practice and practices in higher education*, (pp. 15–35). Heidelberg: Springer.
Keller, J., & Suzuki, K. (2004). Learner motivation and E-learning design: A multinationally validated process. *Journal of Educational Media*, *29*(3), 229–239. https://doi.org/10.1080/1358165042000283084.
Kellogg, S. (2013). Developing modules for an inverted classroom project in cost estimating. In *IEEE Frontiers in education conference*, (pp. 755–760). https://doi.org/10.1109/FIE.2013.6684927.
Kim, M. K., Kim, S. M., Khera, O., & Getman, J. (2014). The experience of three flipped classrooms in an urban university: An exploration of design principles. *The Internet and Higher Education*, *22*, 37–50.
Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. Theory into Practice, 41(4), 212–218, https://doi.org/10.1207/s15430421tip4104_2.

Li, Y., Zhang, M., Bonk, C. J., & Guo, Y. (2015). Integrating MOOC and flipped classroom practice in a traditional undergraduate course: Students' experience and perceptions. *International Journal of Emerging Technologies in Learning*, *10*(6), 4–10. https://doi.org/10.3991/ijet.v10i6.4708.

Marquis, G. P., & Ghosh, S. (2017). Student preferences for a hybrid course. *Journal of Education for Business*, *92*(3), 105–113. https://doi.org/10.1080/08832323.2017.1289886.

Mason, G. S., Shuman, T. R., & Cook, K. E. (2013). Comparing the effectiveness of an inverted classroom to a traditional classroom in an upper-division engineering course. *IEEE Transactions on Education*, *56*(4), 430–435. https://doi.org/10.1109/TE.2013.2249066.

Mayadas, F., & Miller, G. E. (2014). Updated E-learning definitions. http://onlinelearningconsortium.org/updated-e-learning-definitions/. Accessed 24 March 2014.

McNally, B., Chipperfield, J., Dorsett, P., Del Fabbro, L., Frommolt, V., Goetz, S., et al. (2017). Flipped classroom experiences: Student preferences and flip strategy in a higher education context. *Higher Education*, *73*(2), 281–298. https://doi.org/10.1007/s10734-016-0014-z.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*, (p. 55). Washington, D. C: U.S. Department of Education.

Milman, N. B. (2012). The flipped classroom strategy - what is it and how can it best be used? *Distance Learning*, *9*(3), 85–87.

Miyazoe, T., & Anderson, T. (2015). Interaction equivalency in the OER and informal learning era: Best of EDEN 2013-2014, *European Journal of Open, Distance and E-learning*, *18*(2), 25-36.

Moberg, K. (2014). Two approaches to entrepreneurship education: The different effects of education for and through entrepreneurship at the lower secondary level. *The International Journal of Management Education*, *12*(3), 512–528.

Moore, M. G. (1997). Theory of transactional distance. In *Theoretical principles of distance education 1*, (pp. 22–38). London: Routledge.

Ng'ambi, D., Brown, C., Bozalek, V., Gachago, D., & Wood, D. (2016). Technology enhanced teaching and learning in south African higher education – A rearview of a 20 year journey. *British Journal of Educational Technology*, *47*(5), 843–858. https://doi.org/10.1111/bjet.12485.

O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, *25*, 85–95. https://doi.org/10.1016/j.iheduc.2015.02.002.

Oxford Learning Institute (2017). Tutorial teaching. https://www.learning.ox.ac.uk/support/teaching/resources/teaching/. Accessed 26 July 2016.

Picciano, A. G. (2009). Blending with purpose: The multimodal model. *Journal of Asynchronous Learning Networks*, *13*(1), 7–18.

Rienties, B., & Rivers, B. A. (2014). Measuring and understanding learner emotions: Evidence and prospects: Learning analytics review 1. In *Learning analytics community exchange*, (p. 28). Bolton: University of Bolton.

Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning. *Journal of Family and Consumer Sciences*, *105*(2), 44–49.

Saldaña, J. (2013). *The coding manual for qualitative researchers*. Los Angeles: Sage.

Sams, A., & Bergmann, J. (2013). Flip your students' learning. *Educational Leadership*, *70*(6), 16–20.

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education*, *55*(4), 1721–1731. https://doi.org/10.1016/j.compedu.2010.07.017.

Shea, P., & Bidjerano, T. (2012). Learning presence as a moderator in the community of inquiry model. *Computers & Education*, *59*(2), 316–326.

Strayer, J. F. (2007). *The effects of the classroom flip on the learning environment: A comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system*. Ohio: Ohio State University.

Tait, A. (2015). Student success in open, distance and e-learning. In *The ICDE reports series*, (pp. 1–10). Oslo: International Council for Open and Distance Education - ICDE.

Tucker, B. (2012). The flipped classroom -online instruction at home frees class time for learning. *Education Next*, *12*(1), 82–83.

Twigg, C. A. (2003). Models for online learning. *Educause Review*, *38*, 28–38.

Vaughan, N. D. (2010). A blended community of inquiry approach: Linking student engagement and course redesign. *Internet and Higher Education*, *13*, 60–65.

Vaughan, N. D., Cleveland-Innes, M., & Garrison, D. R. (2013). *Teaching in blended learning environments - creating and sustaining communities of inquiry (issues in distance education)*. Edmonton: AU Press.

White, B. E., Gandhi, S. J., Gorod, A., Ireland, V., & Sauser, B. (2013). On the importance and value of case studies. Paper presented at the IEEE Systems Conference.