

Is Distance Education Fun? The Implications of Undergraduates' Epistemological Beliefs for Improving Their Engagement and Satisfaction with Online Learning

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The epistemological beliefs of students are an important area for higher education research. This paper firstly reports on a research review concerning the impact of epistemological beliefs on academic outcomes. This review indicates that students' epistemological beliefs are an influence on their engagement with learning and academic success, and that educators should consider them in developing learning experiences. This issue became particularly pertinent in the context of a global pandemic that necessitated an international trend in moving to online distance education, where student disengagement is more likely to occur. However, research into distance education students' epistemological beliefs emerged as an under-researched field. Consequently, an empirical questionnaire study was conducted with data collected from 550 distance education students. A principal component analysis indicated that particular epistemological beliefs were significantly associated with students' enjoyment of studying online. Their beliefs regarding the role of fun in online learning materials and activities are discussed, and the usefulness of considering fun and epistemological beliefs as factors within distance learning in higher education is highlighted.

Keywords: epistemological beliefs, higher education, fun, online learning, academic success

Introduction

Many universities across the world responded to the COVID-19 pandemic by developing their online teaching provision. However, online higher education is a context in which the number of students who fail to complete is significantly higher than found in traditional university settings (Woodley & Simpson, 2013). Therefore, there has been an increased need, worldwide, to understand how best to

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ensure the success of higher education (HE) students studying online. One potential influence concerns students' epistemological beliefs.

Epistemology concerns the theory and study of knowledge and epistemological beliefs are people's beliefs about some aspect of knowledge (Schraw, 2013). These beliefs, for example, might be about notions of ability, and the extent to which the a person's ability to learn is genetically determined or can be enhanced through education and experience (Schommer-Aikins & Hutter, 2002) or the extent to which learning is the process of a simple transmission of information (OECD, 2009). Research has been carried out on the epistemological beliefs of higher education students, and how they develop, for at least 50 years (Richardson, 2013). Research has also investigated the relationship between students' personal epistemological beliefs and their behaviour and judgements concerning real life issues (Schommer-Aikins & Hutter, 2002; Sheehy, Budiyanto, Kaye, & Rofiah, 2017).

There is evidence to suggest that students' personal epistemological beliefs are reflected in the strategies they use in their academic studies, and that undergraduate students' epistemological beliefs might be a predictor of both their academic performance and their likelihood of reviewing courses favourably to others (Richardson, 2013). This conclusion is supported in questionnaire-based studies that show, perhaps not surprisingly, that students who hold epistemological beliefs that see knowledge being constructed by themselves, and where their ability can improve, employ relatively more effective study and problem-solving strategies and achieve higher levels of academic success (Çevik, 2015).

These beliefs appear to vary between different subject disciplines. For example, social science students have been found to be more likely to see learning as dependent on contextual factors and their own effort, whereas students studying health related subjects are more inclined to emphasise the importance of innate ability (Ismail et al., 2013; Tumkaya, 2012). These beliefs occur in a context where students' teachers and learning-resource creators also have their own epistemological beliefs, which influence how they teach and what they expect students to do within learning activities. Consequently, a key factor in a students' educational experience is the 'epistemic match' between their personal epistemological beliefs, their subject discipline and the pedagogic activities that they encounter (O'Siochru & Norton, 2014). It can therefore be argued that student engagement, satisfaction and academic success in higher education are influenced by their personal epistemological beliefs and how well (or not) these match with the epistemological assumptions of their disciplinary area and its teaching activities.

Another proposed influence on student engagement and success concerns the extent to which HE learning experiences are perceived as enjoyable and fun (Kuh, Kinzie, & Buckley, 2006). Consequently, it has been argued that that there is a need for research that examines students beliefs about fun in their learning (Whitton & Langan, 2018).

This study had two parts. Given the posited influence of epistemological beliefs there was a need for a structured review of research regarding their relationship with academic performance. This review highlighted a lack of research in the field of distance education and so, to address this gap, research with

a cohort of distance education students was undertaken. As the relationship between epistemological beliefs and fun in H E learning is not established, this research also considered the relationship between students' epistemological beliefs, enjoyment of their studies and beliefs concerning fun in learning.

Part 1. A review was carried out to consider two questions:

1. What evidence is there that students' epistemological beliefs have an impact on academic outcomes?
2. What are the implications for distance education students?

Method

A structured literature review was carried out. The term 'structured' (Armitage & Keeble-Allen, 2008) is used as this review did follow full systematic review protocol such as weighting articles with regard to effect sizes (Karolinska Institutet, 2017; Newman & Gough, 2020). This general method is well established for exploring educational issues (Rix et al., 2020). The protocol for this type of review, and the way in which it is reported in publications is well established (Zawacki-Richter et al., 2019). The transparency of this process is helpful for subsequent research that might build on or extend this database. In the context of the current research, the review acts to reveal what is known and not known about a phenomenon, identifying topics requiring investigation and validating the need for, and focusing, the subsequent research (Zawacki-Richter et al., 2019; Paré et al., 2015).

Two overarching databases were searched: Scopus and Ebscohost (which includes APA PsychInfo and ERIC databases). These databases were judged to give a sufficiently broad coverage. Scopus is the largest abstract and citation database for peer reviewed literature and scientific journals, and Ebscohost covers a range of large research databases encompassing education, humanities and social sciences.

The search terms used to identify potential studies were:

- Epistemological beliefs
- Higher education
- University students
- Distance learning or education
- Questionnaire
- Adults
- Conceptions of learning
- Epistemological development
- Survey
- Ways of knowing

The search results were screened by employing inclusion criteria to identify studies with a specific scope (a focus on students within Higher Education and epistemological beliefs). The inclusion criteria applied to the search results were:

- In English
- Available online
- Years: All [up to May 2018]
- Adults
- Higher Education

The exclusion criteria mirrored the inclusion criteria for example ‘not adults’, or “not within Higher Education”. The exception to this was ‘Distance Education’ All studies returned from searches were documented in a spreadsheet and downloaded into bibliographic software.

In keeping with guidance for reviews (Xiao & Watson, 2019), screening was iterative and applied first to titles, then abstracts (in two iterative stages) and finally to the full documents. Two independent screeners carried out the screening of all titles and studies. A third, additional, independent screening took place of all the full papers. This graduated review and selection process created a ‘descriptive map’ of the studies.

Results

The process of selection is illustrated in Figure 1.

Figure 1. Selection of Review Articles

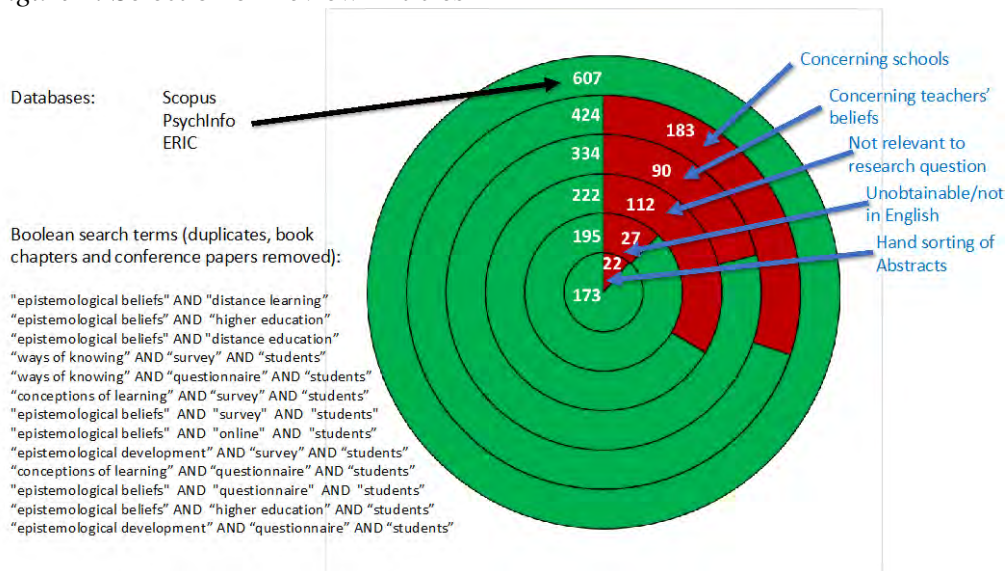


Figure 1 illustrates how 607 studies were initially selected, and the number of studies subsequently removed by the application of the exclusion criteria. This

resulted in 173 studies being selected for inclusion in the research review (Appendix 1).

Descriptive Analysis

As expected, in almost all cases the participants were full-time students who attended 'regular' universities or HE institutions. It was notable that only six studies diverged from this, being concerned with part-time distance education students (Fidan, 2016; Guven, 2009; Makoe, Richardson, & Price, 2008; Parrish & Linder-Vanberschot, 2010; Richardson, 2007, 2010).

Measures Used in the Studies

Reviewing the methods that were used across the studies revealed that ad hoc questionnaires were the most commonly used, being noted in 26 studies. In these cases, researchers generated their own question items, typically based on a literature review and/or drawing on expert and participants interviews.

Outside of these ad hoc questionnaire approaches a wide variety of methods occurred. The most popular approaches are illustrated in Figure 2.

Figure 2. The Most Commonly Used Approaches for Addressing Higher Education Students' Epistemological Beliefs

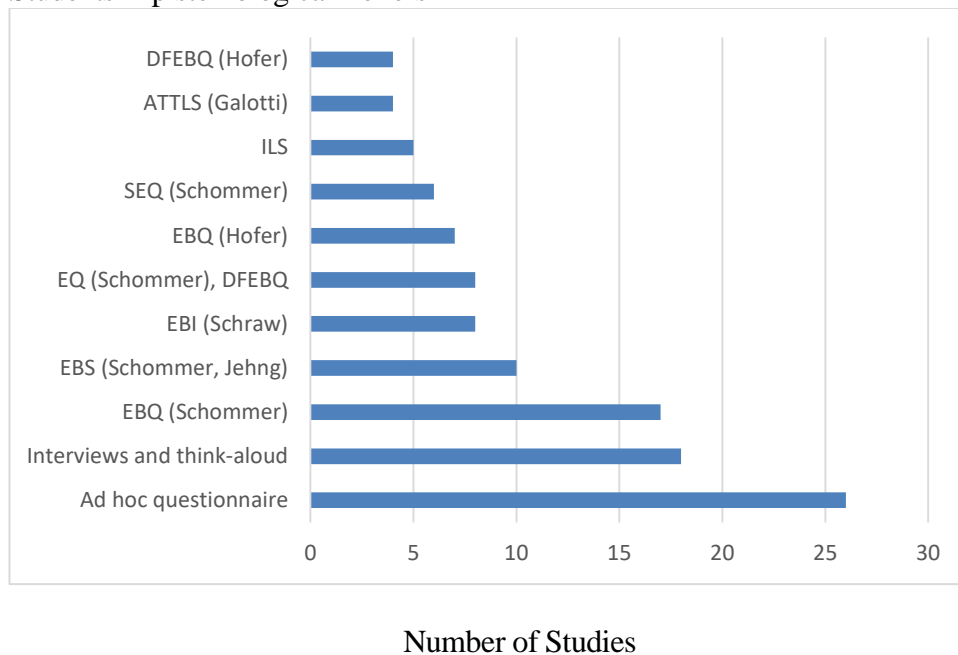


Figure 2 illustrates the most commonly used approaches for addressing Higher Education students' epistemological beliefs [Key: DFEBQ Discipline-Focused Epistemological Beliefs Questionnaire (Hofer, 2000); ATTLS Attitude Towards Thinking and Learning Survey (ATTLS) (Galotti et al., 1999); ILS Inventory of Learning Styles (Vermunt, 1994); SEQ Schommer Epistemological Questionnaire (Schommer, 1993); EBQ Epistemological Beliefs Questionnaire

(EBQ) (Schommer, 1994); EQ Epistemological Questionnaire (EQ) (Schommer, 1993); EB1. The epistemic belief inventory (EBI) (Schraw, Dunkle, & Bendixen, 1995); EBS Epistemological Belief Scale (Schommer, 1990)].

As Figure 2 illustrates, in terms of standardised questionnaires, Schommer's work appears to be particularly influential. However, differentiating between the various tools was not always straightforward as researchers may refer to the same tool using a different name. For example, some researchers referred to Schommer's EQ as the EBQ, however the term EBQ is more accurately used to indicate Hofer's work (Sheehy, 2015).

These different assessments and models of epistemological beliefs have been used in relation to mapping the development of participants' beliefs. Initial, or less well developed 'naive' beliefs (Erdamar & Alpan, 2013) are characterised by agreement that knowledge is certain or absolute and transmitted by an authority figure, and that learning ability is fixed. More developed beliefs have been defined as seeing knowledge created within a context, acknowledging its complexity, and that it is constructed through effort, evidence and experimentation (Erdamar & Alpan, 2013).

Assessment of Impact

The selected 173 studies were coded regarding the posited relationships between epistemological beliefs and academic outcomes. This initial coding identified studies that imputed a correlational or causal relationship. Of 173 studies, 43 studies presented evidence that epistemological beliefs significantly influenced students' academic outcomes. Typically, a regression analysis was carried out that identified that a particular measure of epistemological beliefs could predict another academic measure or performance outcome. For example, Marrs and Benton (Marrs & Benton, 2009) used ATTLS (Galotti et al., 2018) and found that epistemological beliefs significantly influenced students approaches to learning. This effect was supported elsewhere, for example, that students' epistemological beliefs (measured using EBI (Schraw, Bendixen & Dunkle, 2002) could predict their engagement with, and comprehension of, complex texts (Karimi & Atai, 2014). In line with this, students with more developed, complex, beliefs achieved significantly better results in their studies than those with more simple, naive, views of knowledge (Tolhurst, 2007). The relationship, between beliefs and study approaches, could be interactive, as illustrated in Tolhurst (2007), who found that engagement with small group active learning activities produced changes in students' epistemological beliefs (measured with EQ, Schommer, 1990). In 20 studies a correlational relationship was identified between students' epistemological beliefs and other factors, such as social background or locus of control. For example, the disciplinary background of students was associated with differences in their epistemological beliefs. Those with less complex beliefs favoured information transmission/teacher centred learning approaches. However, this variation was not necessarily uniform within disciplines, and students and academics even within the same discipline could hold different views of learning and knowledge (Päuler-Kuppinger & Jucks, 2017). Within discipline

areas, increased experience of tertiary education was associated with changes in the epistemological beliefs, and approaches to learning, of some (but not all students) (Rodriguez & Cano, 2007) and students use of online collaborative learning resources, was associated with developments in their epistemological beliefs, moving towards more complex, and less absolute, views of knowledge and an increased beliefs in collaborative constructivist ways of learning (Chan et al., 2013).

The findings of the research review suggested compelling evidence that that the epistemological beliefs of students have a significant influence on the strategies that they bring to their online studies, and how successfully they engage with curriculum activities. The findings also highlighted that the field of distance education is relatively unexplored. One feature of distance education is an increased incidence of students who do not complete their studies. Although this 'drop out' rate varies considerably between institutions and contexts it is significantly worse than found in traditional higher education provision (Bawa, 2016). Addressing this issue has been explored through various pedagogical and technological responses (Stone, 2017), and the importance of finding ways to improve student satisfaction have been highlighted repeatedly (Abuhassna et al., 2020; Bornschlegl, & Cashman, 2018). Reviews of student satisfaction, linked to successful study in traditional settings, indicate that many students choose their studies seeking personal enjoyment, and learn more effectively when classrooms are friendly and fun (Kuh, Kinzie, & Buckley, 2006). More broadly happiness, conceptualised in different ways, has been indicated as a central part of pedagogical beliefs in cross cultural research (Budiyanto, Sheehy, Kaye, & Rofiah, 2017). In the context of distance education, Richardson (2013) identified that epistemological beliefs were associated with the likelihood of students reviewing courses favourably to others (Richardson, 2013), having presumably enjoyed their study experience. This suggested a hypothesis that, as with traditional HE students, there is a relationship between distance education students' epistemological beliefs and their success and enjoyment of a particular course. Possibly related to this is the notion of fun in learning. The case that fun might be important within learning would seem to have face validity. For example within the field of physical activity and wellbeing fun is an important concept in determining motivation and participation (Agbuga, Xiang, & McBride, 2013). However within other learning contexts the relationship between fun and learning is contested and under-researched (Ferguson et al., 2020). Fun can be seen as being in opposition to meaningful learning (Ferguson et al., 2020) and having little value within Higher Education pedagogy (Whitton & Langan, 2018). From the perspective of epistemological beliefs, this raises the novel question of whether students' beliefs about the relationship between fun and learning are influenced by their personal epistemological beliefs.

Part Two. Therefore, part two of the research examined two issues.

1. Is there is a relationship between distance education students' epistemological beliefs and their enjoyment of a particular course?

2. Are students' beliefs about the relationship between fun and learning influenced by their personal epistemological beliefs?

Method

Self-report questionnaires are the predominant method of epistemological beliefs research (Schraw, 2013). Two broad approaches can be identified within this type of educational research (Sheehy, Budiyanto, Kaye, & Rofiah, 2017). The first is exemplified by Schommers' work, which addresses beliefs about the nature of knowledge itself (Schommer, 1990). The second approach draws on developmental psychology and pedagogical theory, and can be seen in research such as that carried out by the Organisation for Economic Co-operation and Development (OECD), who researched teachers' epistemological beliefs across 23 countries and used items that distinguished between direct transmission and constructivist views of learning (OECD, 2009). This latter approach was chosen to underpin the development of the questionnaire for the current research, as it has a more direct and explicit relevance to students' teaching and learning experiences.

A questionnaire was created drawing items from existing questionnaires (see Appendix 1), with the addition of two 'fun in learning' questions.

Items 1-14 related to models of learning (Constructivist, Social Constructivist and traditional/direct transmission), and were taken from Sheehy and Budiyanto's (2015) development of the Theoretical Orientation Scale (Hardman & Worthington, 2000). Items 15 and 16 drew on Lee, Zhang, Song, and Huang's (2013) research, concerning innate/fixed ability and effort and process (Q22). Beliefs about the relationship between happiness and learning (Budiyanto, Sheehy, Kaye, & Rofiah, 2017) is reflected in Q18. Two items were developed concerning fun. Q19 'Successful learning involves fun' and Q20 'fun hampers learning'. Finally Q20 asked if students enjoyed their current module.

Procedure

An anonymous online questionnaire was developed using Qualtrics™. An invitation to participate in the study, along with information about the study, was posted on the 'news' space of one Level 1 (First year) University module. In this way approximately 4,000 students were potentially able to read the invitation, of whom 550 participants completed the questionnaire. This suggests a response rate of approximately 14%, which is comparable to other studies of Level 1 undergraduates at the same university (Ellis, Gallagher, & Peasgood, 2018; Fayram et al., 2018).

The research followed the British Psychological Society ethical guidance (British Psychological Society, 2014) and was given a favourable opinion by the Human Research Ethics Committee of The Open University.

Participants

The 550 participants were Level 1 undergraduates from an online education course (E102: Introduction to Childhood Studies and Psychology) offered by The Open University (United Kingdom).

Pedagogic Context

The Open University (United Kingdom) was established in 1969 to provide distance education, utilising pedagogical and technological expertise. It has led the mainstreaming of tutor supported e-learning to become one of Europe's largest universities (Pulker & Papi, 2021). The participants were studying Level 1 (first year) course, whose pedagogy is interactive and explicitly offers ‘..a range of interactive online activities throughout the module to support your learning..’ [<http://www.open.ac.uk/courses/modules/e102>]. These activities encompass interactive forums, tutorials, quizzes and interactive teaching materials.

Part 2 Findings

The collected data were examined for conducting a principal components analysis (PCA). They were confirmed as suitable (Bartlett's test of sphericity, $p > 0.001$) and the sample size was greater than the required minimum (MacCallum & Widaman, 1999). A Kaiser–Meyer–Olkin test of sampling adequacy gave a score of 0.760, indicating that reliable factors could be extracted. Therefore, a PCA with Varimax rotation was carried out

Informed by a scree plot, six components were extracted, and items values below 0.25 were screened out (see Table 1). The six components account for 55.3% of the variance (approximately 18.5%, 9.5%, 8.3%, 7.3%, 6.1% and 5.3% respectively). The degree of variance explained is comparable to and larger than that found in other epistemological research, for example (Castéra & Clément, 2012; Maier, Greenfield, & Bulotsky-Shearer, 2013).

Table 1. Rotated Component Matrix

Rotated Component Matrix ^a						
	Component					
	1	2	3	4	5	6
2S_collaborative-learn	.810					
4S_productive_talk	.764					
1Socially engaged	.716					
3Social_production_knowledge	.582					
6Teach_clear_answer		.831				
7Teach_facts		.784				
5Teach_correct_solution		.716				
18F_must be happy			.852			
19F_Learn_involves_Fun			.730			
9F_enjoy_learn			.722			
10Learn_find_solution				.739		
11Learn_think_solutions				.694		
12Learn_reasoning				.618		
8Teach_inquiry				.514	-.287	
17Teach_single_way					.728	
20Fun_can hamper					.647	
16Taught_according_intelligence					.581	
14L_not_stay_average						.691
15L_depend_effort						.654
21F_enjoy_E102	.292					.497
13L_not_fixed					-.381	.481

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The 6 extracted components map clearly onto the different groups of epistemological beliefs contained within the questionnaire. The components also indicate significant relationships between particular epistemological beliefs and students' enjoyment of the course.

Component 1 reflects Social Constructivist beliefs, which sees learning as a social process, and these beliefs are associated with an enjoyment of studying E102. Component 2 reflects a traditional Transmission view of learning. Component 3 reflects a belief in the importance of positive emotions in learning: [To learn effectively, students must enjoy their learning, to learn effectively, students must be happy whilst learning, Learning should involve fun]- within the activity, the experience of learning and themselves. Component 4 reflects a constructivist view of learning, though problem solving and developing reasoning skills. Component 5 indicates beliefs that see learning ability as innate and fixed. [Students' educational potential is fixed at birth]; that they should be taught according to [these fixed] intelligence levels, using a single approach and the teacher's role is not to facilitate

students' own inquiry, and these are associated with a belief that fun hampers learning. Component 6 contains beliefs in personal development through learning - that learning ability is not fixed, how much students get from their learning depends mostly on their effort, and a belief that students who begin university with 'average' ability do not remain 'average' throughout their studies. These beliefs are significantly associated with enjoying studying their current course.

A post hoc comparison of students who did and did not enjoy the module complements these findings. The responses of the group of students who did not respond positively to the module were examined using a t test (de Winter & Dodou, 2010, for the rationale). This indicated that this group contrasts with those who enjoyed the module primarily in relation to social constructivist beliefs. Their responses differed regarding how much they valued collaborative learning [e.g., 31.5 % vs 58% agreed that students learn best through collaborative activities respectively] ($p < 0.001$, two-tailed, independent samples t test) and significant differences were found in relation to the other social constructivist items: Social production of knowledge ($p < 0.005$, two-tailed, independent samples t test) and Productive talk ($p < 0.001$, two-tailed, Ind. samples t test). Correspondingly, the group who did not enjoy the module also appeared to hold different beliefs about the potential for personal development. This was evident in the differences (with the 'enjoyed the module' group) on items: Learning ability is not fixed, where the 'not enjoy the module' group were significantly less likely to agree ($p < 0.005$, two-tailed, independent samples t test), and Learning depends on effort ($p < 0.005$, two-tailed, independent samples t test). These differences complement the PCA, in that social constructivist beliefs (Component 1) and beliefs in the possibility of learners abilities improving (Component 6) were associated with an enjoyment of the course,

This confirms that a significant relationship exists between students' epistemological beliefs and their enjoyment of the module. Students who hold stronger social constructivist beliefs are more likely to enjoy the module than those who don't. In addition, those who believe that learning ability is not fixed and that their learning depends on their own effort are more likely to enjoy the module.

Previous research has shown that epistemological beliefs vary between subject areas, and change with level of study (Sheehy, 2015). A nonparametric analysis was used to examine the relationship between students' areas of study (intended degree pathway) and their epistemological beliefs. This found that, overall, students from different disciplines of distance education study did not respond significantly differently on their responses to the epistemological belief items. Similarly, examining students' previous highest level of study found that this did not appear to be associated with differences in their responses to the epistemological beliefs items. However, their previous study did have an effect in relation to their responses to the 'enjoyment of E102' question. Whilst nearly all students enjoyed the module, those who enjoyed it the most had previous level 2 experience (Kruskal Wallis, $p < 0.03$).

Discussion

This research makes an original contribution to understanding the factors that influence the success of higher education students' online studies.

Firstly, the literature review makes explicit an existing body of work which indicates the significant impact that students' epistemological beliefs have on their study strategies and outcomes. In doing this it identifies the notable absence of similar research within the burgeoning area of online HE provision. Secondly, empirical data collected in examining the epistemological beliefs of 'online' HE students, which identifies the importance of these beliefs within distance education. Given the increasing importance worldwide of this type of provision, our research indicates that the epistemological beliefs of distance education students merit becoming part of HE researchers agenda.

The empirical findings reveal a clear and significant link between students' epistemological beliefs and their enjoyment of the module they were studying. Those whose beliefs could be described as social constructivist were more likely to enjoy the module they were studying. This implies that there is an 'epistemic match' between their personal epistemological beliefs, their subject discipline and the pedagogic activities they encounter (O'Siochru & Norton, 2014). This idea is supported by the module's extensive provision of interactive teaching materials and activities, [<http://www.open.ac.uk/courses/modules/e102>]. Students who believe that much learning occurs through collaboration and interaction, will presumably feel that these sorts of teaching approaches are appropriate and valuable for their own development. In contrast, students whose personal epistemological beliefs are largely transmissive in nature, are less likely to see the value of these activities for their own learning. It seems reasonable to suggest that, consequently, these students are less likely to review the module favourably and are at a relatively increased risk of disengaging from this form of study. This raises the question of how one might address this situation and increase the likelihood of a successful study experience.

A suggestion has been made that making HE student's learning activities fun and enjoyable would promote engagement and study satisfaction and, because it is an under researched area, that there to research students beliefs about the place for fun in their studies (Whitton, & Langan, 2019). Our research contributes to the search for a better understanding by offering a new perspective on this issue, which suggests that a more nuanced picture of the situation is required than currently exists. We have found that epistemological beliefs are associated with different beliefs about module satisfaction and also the place of fun in learning, in the context of online distance education. Students who hold the associated beliefs captured in Component 1 (see Table 1) were most likely to enjoy their study experience, and those holding the beliefs reflected in Component 5 (see Table 1) believe that fun can hamper their learning.

The implications of this are that understanding students' personal epistemological beliefs has potential for acting as an indicator of student satisfaction before they begin a course of study or module, using the concept of epistemic match.

This is an important finding for distance education and contributes to a way of addressing the long known ‘damaged planes’ issue (Wald, 1943). This issue acts as a metaphor for a problem faced by distance educators seeking to understand and promote student success and positive experiences (and hence positive student reviews).

Wald was looking to improve the safety of war planes during World War II. He realised that the traditional approach to this issue was flawed through a form of selection bias, namely that engineers could only examine the planes that had managed to return to base. They looked at the nature and location of any shot damage, and improved new planes accordingly. They reinforced areas that had been hit the most. Wald realised the holes indicated where aircraft could be hit and still fly home. His counterintuitive decision was to reinforce the areas which had not been hit, which proved successful.

In distance education it is common practice to carry out student satisfaction surveys and to use this feedback to inform course development. Responding to these surveys is seen as a pillar of ensuring quality online education and addressing the major goals of reducing student drop out and improving success (Ali, Ramay, & Shahzad., 2011). An issue in achieving these goals is that researchers typically sample students who are still engaged with, or successfully completed, a module (Kara, Erdoğan, Kokoç, & Cagiltay, 2019). Those students who have ceased to engage with a course or have dropped out are not sampled. This selection bias may be a factor that undermines both our understanding of factors that contribute to success and attempts to tackle the 40-80% drop out rates which some distance education researchers have identified (Bawa, 2016). Whilst the current study is similarly, and necessarily, flawed in respect of sampling engaged students, its findings offer a potential means of predicting which courses/modules a particular student will enjoy or not, and whose learning activities they will value or not, based on their epistemological beliefs.

Although this study contributes to an improved understanding of student’s belief about fun in learning, it raises some difficult issues for educators seeking to act on this. One way to improve students’ study experience might be to facilitate the development of their epistemological beliefs, for example from a transmission view to a more socially based view of knowledge and learning. This idea is underpinned by a belief that there can be a developmental progression in HE students between simple ‘naïve’ beliefs and more sophisticated ones (Richardson, 2013). This approach is illustrated, in traditional HE settings by the work of Florian & Rouse with teacher education students (Florian & Rouse, 2009). Their approach utilized structured reflection activities that helped students move away from direct transmission/traditional epistemological beliefs (Brownlee, Purdie, & Boulton-Lewis, 2010; Florian & Rouse, 2009). The aim of this approach is seen not as categorizing some people as having the ‘wrong’ beliefs but giving them opportunities to develop their beliefs. However, the curriculum activities and pedagogy clearly seek, and are designed to, support change. There is an ethical dimension to whether and how one might choose to influence the development of students’ epistemological beliefs (Sheehy, 2017). In essence there is a choice for educators between seeking to develop or change students’ personal epistemological

beliefs or to create learning expectations that acknowledge a diversity of beliefs. There is unlikely to be a universal solution to this issue, given the epistemological diversity that exists in different higher education disciplines (Ismail et al., 2013; Tumkaya, 2011). There are also clear cultural differences, such as those revealed in the Organisation for Economic Co-operation and Development (OECD) survey of teachers across twenty-three countries, which found that beliefs in direct transmission and constructivism (OECD, 2009) varied markedly between countries. In some countries' responses fell into transmission vs constructivism categories (OECD, 2009, p. 95). However, in other countries this division did not occur (OECD, 2009) and it has been argued that the idea of constructing (or implying) some beliefs as better than others, is flawed because it is based solely on a western perspective of education (Hofer, 2010). The implications of understanding this broader context are that care is needed in generalizing the findings of the current research to other contexts. However, they do have validity in relation to UK distance education students. Furthermore, within the literature review there is evidence that different study approaches, reflecting underpinning epistemological beliefs, lead to different outcomes from academic study. This implies that some personal epistemological beliefs are likely to be associated with better outcomes. In this context developing student epistemological beliefs that create a better epistemic match with modules across their degree programme could support better outcomes. The findings from this research challenge the idea that simply creating learning activities that are fun would necessarily benefit all students. For students who hold a transmissive view of learning, such attempts are likely to be seen as having relatively little merit. However, this suggests a novel idea for future research, whether developing epistemological beliefs might also impact on students beliefs about fun in learning and thereby their enjoyment of their study activities.

How educators respond to these ideas when seeking to improve students engagement will reflect their own epistemological beliefs, whether this be to develop or change students' personal epistemological beliefs, to create learning expectations that acknowledge a diversity of beliefs or select, match or even screen out students for specific courses. Similarly, choices educators make about the use of 'fun' will also reflect their epistemological beliefs. So, whilst some may assert that fun is 'unsuitable in the 'serious' business of Higher Education' (Whitton & Langan, 2018, p3), the current study presents a more nuanced picture and supports research by Ferguson et al. (2020) in challenging this belief by presenting evidence that this is not a universal truth. It goes beyond this research by revealing how epistemological beliefs are related to beliefs about the role of fun in learning.

Conclusions

The findings from this study indicate that student engagement, satisfaction and academic success in higher education are related to their personal epistemological beliefs and how well (or not) these match with the epistemological

assumptions of their disciplinary area and its teaching activities. It also identifies a lack of research concerning this issue within distance education research. Findings from a cohort of distance education students indicate that their epistemological beliefs influence the degree to which they enjoy the studies, and their beliefs about the role of fun in their learning. This offers a more nuanced understanding of these issues than currently exists by identifying the impact of specific types of belief on students' study experiences. Whilst offering insights that might be used to help educators support students, it also highlights that making these changes raises challenging ethical issues. Lastly, by revealing the link between epistemological beliefs and perceptions of the role of fun in learning, the study indicates a new area of distance education research, a new way of understanding beliefs about fun in learning, and why this is an important factor in HE studies.

Acknowledgments

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Appendix 1

Questionnaire Items

1. Meaningful learning occurs when students are engaged in social activities
2. Students learn best through collaborative activities.
3. Learning can be defined as the social production of knowledge
4. Helping students to talk to one another productively is a good way of teaching.
5. Effective/good teachers demonstrate the correct way to solve a problem.
6. Teaching should be built around problems with clear, correct answers.
7. The teacher's role is to teach facts
8. The teacher's role is to facilitate students' own inquiry
9. Students should enjoy learning
10. Students learn best by finding solutions to problems on their own.
11. Students should be allowed to think of solutions before the teacher shows them how they are solved.
12. Thinking and reasoning processes are more important than specific curriculum content.
13. Students' educational potential is fixed at birth.
14. Students who begin university with 'average' ability remain 'average' throughout their studies
15. How much students get from their learning depends mostly on their effort
16. All students should be taught in homogenous classes according to their intelligence.
17. I believe there should be a single teaching method applicable to all learning situations.
18. To learn effectively students must be happy
19. Effective learning involves fun
20. Fun activities can get in the way of student learning
21. I enjoy my current course.