Facilitating student engagement through educational technology in higher education: A systematic review in the field of arts and humanities

Svenja Bedenlier
FernUniversität in Hagen, Germany

Melissa Bond
University of Oldenburg, Germany

Katja Buntins
University of Duisburg-Essen, Germany

Olaf Zawacki-Richter
University of Oldenburg, Germany

Michael Kerres
University of Duisburg-Essen, Germany

Understanding how educational technology can enhance student engagement is becoming increasingly necessary in higher education, and particularly so in arts and humanities, given the communicative nature of courses. This narrative systematic review synthesises 42 peer-reviewed arts and humanities articles published between 2007-2016, indexed in four international databases. The results indicate that the majority of research has been undertaken in language learning, predominantly in East Asian countries, with limited grounding of research in theory. This review found that educational technology supports student engagement, with behavioural engagement by far the most prevalent dimension. Affective engagement was the lowest observed dimension, with affective disengagement the most prevalent negative dimension. Blogs, mobile learning, and assessment tools were the most effective at promoting engagement. However, caution and education in how to use technology are needed, as any use not underpinned by effective and informed pedagogy can also lead to students feeling overwhelmed and disengaging from learning. Further research is needed on online collaboration, as well as international courses that offer cross-cultural opportunities for language use, and the increased use of qualitative methods is also advised.

Implications for practice or policy:

- Empirical research on student engagement must include a definition and be aligned to theory.
- Research must include full contextual details.
- Students need to understand the reasons behind using educational technology, be taught how to use the tools involved, and be encouraged to engage with peers and teachers through blogs, ePortfolios and collaborative tools.
- Using blogs and discussion forums can help students to model language and thereby reduce anxiety.

Keywords: systematic review, educational technology, student engagement, language learning, arts and humanities

Introduction

With the documented need for higher education graduates to be proficient in using educational technology (EdTech) in their professional lives (e.g., Organization for Economic Cooperation and Development [OECD], 2015; Redecker, 2017), as well as acquiring twenty-first century skills during their studies (Claro & Ananiadou, 2009; Oliver & Jorre de St Jorre, 2018), the use of EdTech in higher education has attracted increased interest from researchers, for example, in the technologies that students find helpful or unhelpful in their studies (Henderson, Selwyn, & Aston, 2017; Selwyn, 2016) and patterns of media usage of

(non)traditional students (Dolch & Zawacki-Richter, 2018). Furthermore, research has found that the pedagogically informed use of technology can also support student engagement (e.g., Schindler, Burkholder, Morad, & Marsh, 2017), a concept that has been gaining importance recently, as it links the individual student's internal constitution and external environment, leading to overall improved student outcomes (see Bond & Bedenlier, 2019).

Whilst there are ongoing conversations about the nature of student engagement, researchers agree that it is an enigmatic and complex construct (Appleton, Christenson, & Furlong, 2008; Kahu, 2013), with three generally accepted dimensions; behavioural, affective, and cognitive (Fredricks, Blumenfeld, & Paris, 2004). Each dimension houses facets (called indicators by some researchers) of engagement and disengagement (Appendix A), which students experience on a continuum (Coates, 2007; Payne, 2017) of high or low activation and positive or negative valence (Pekrun & Linnenbrink-Garcia, 2012). This study is guided by the following definition:

> Student engagement is the energy and effort that students employ within their learning community, observable via any number of behavioral, cognitive or affective indicators across a continuum. It is shaped by a range of structural and internal influences, including the complex interplay of relationships, learning activities and the learning environment. The more students are engaged and empowered within their learning community, the more likely they are to channel that energy back into their learning, leading to a range of short and long term outcomes, that can likewise further fuel engagement (Bond, Buntins, Bedenlier, Zawacki-Richter, & Kerres, 2020, p. 3).

Given that the nexus between SE and technology use in higher education has not yet been comprehensively researched, a systematic review was conducted into this topic, comprising a total of 243 empirical studies (see Bond et al., 2020). A keyword-based search focused on "systematic review" OR "meta analysis" OR "literature review" AND "educational technology", conducted in April 2019, yielded a small number of studies that addressed the specific context of English as a second language (ESL) and English as a foreign language (EFL), as a discipline within arts and humanities (A&H) (United Nations Educational, Scientific and Cultural Organization Institute for Statistics [UNESCO] Institute for Statistics, 2015). However, the focus of three meta-analyses identified was not on the greater concept of student engagement, but rather primarily on achievement (Chang & Lin, 2013; Chiu, Kao, & Reynolds, 2012; Cho, Lee, Joo, & Becker, 2018), whilst other reviews found blended learning in ESL/EFL to be one way to enhance motivation (Albiladi & Alshareef, 2019), and another reviewed how language learning, mediated through digital games, influenced student learning outcomes on different levels (Hung, Yang, Hwang, Chu, & Wang, 2018). Therefore, in order to gain a broader overview, and to deepen insights into technology use within the field of A&H, the following research questions guide this analysis:

1. What are the characteristics (countries, educational settings, study population, technology tools used) of and methods used in research on SE and EdTech in higher education, within the field of A&H, and how do they compare to the overall sample?
2. How is research within the field of A&H theoretically grounded?
3. Which facets of student engagement and disengagement are affected as a result of using EdTech in the field of A&H?

Method

As part of a larger research project, a systematic review was conducted into the relation of EdTech and student engagement in higher education (Gough, Oliver, & Thomas, 2012). Clear inclusion and exclusion criteria were applied (Table 1), limiting the search to publications from 2007, to ensure that technology tools were not outdated. In order to provide transparency of the review process, a review protocol was created, which can be retrieved from ResearchGate at https://www.researchgate.net/project/Facilitating-student-engagement-with-digital-media-in-higher-education-ActiveLeaRn, alongside the full data set.

Screening 18,068 titles and abstracts led to 4,152 remaining references for potential inclusion (Figure 1). Due to time limitations and the large number of relevant articles in the population, a sample size estimation was carried out with the R Package MBESS (Kelley, Lai, Lai, & Suggests, 2018), to identify a sample from this reference corpus for further analysis (Kupper & Hafner, 1989). Under acceptance of a 5% error range,

a percentage of 50%, and an alpha of 5%, 349 articles were sampled. Taking into consideration the increased diversity of EdTech over the past years and the likewise increasing prominence of the concept of student engagement (Zepke, 2018), the articles were stratified by their year of publication. The 349 articles were screened on full text and 232 were then included, some of which reported on more than one study. Subsequently, 243 individual studies were coded, applying an inclusive code scheme.

Table 1
Final inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Published between 2007-2016	Published before 2007
English language	Not in English
Higher education	Not higher education
Empirical, primary research	Not empirical, primary research (e.g., review)
Indexed in ERIC, Web of Science, Scopus or PsycINFO	Evaluation or a description of a tool
Educational technology	No educational technology
Student engagement	No learning setting
	No student engagement

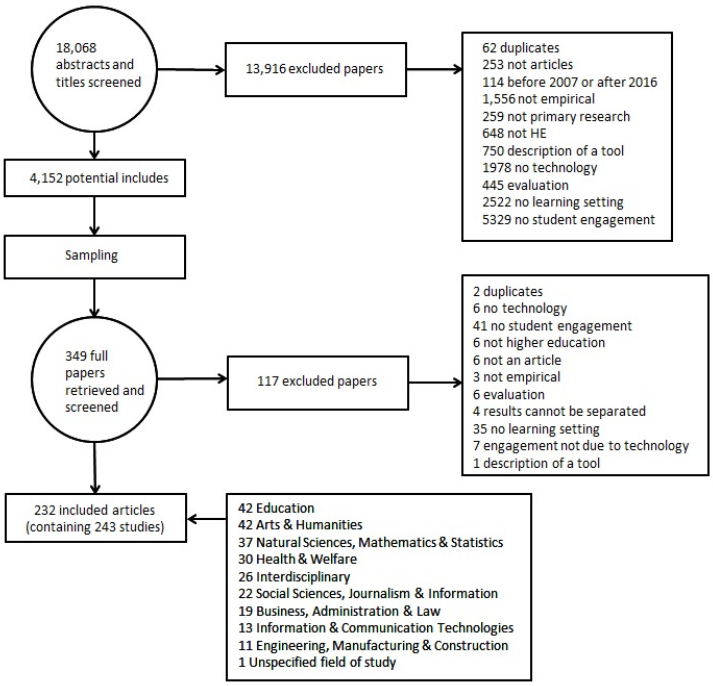

Figure 1. Systematic review PRISMA flow chart, slightly modified after Brunton and Thomas (2012, p. 86) and Moher, Liberati, Tetzlaff, & Altman (2009, p. 8)

Due to the sheer number of educational technology tools and applications identified across the 243 studies, a problem also shared by other reviews (e.g., Lai & Bower, 2019), the decision was made to employ Bower's (2016) typology of learning technologies (Appendix B), in order to group tools that share the same "structure of information" (Bower, 2016, p. 773). Whilst some of the tools could be classified into more than one type within the typology, for example wikis can be used for collaborative tasks, knowledge organisation and sharing, or for individual website creation, "the type of learning that results from the use of the tool is dependent on the task and the way people engage with it rather than the technology itself" therefore "the typology is presented as descriptions of what each type of tool enables and example use cases rather than prescriptions of any particular pedagogical value system" (Bower, 2016, p. 774). For a deeper explanation of each category, please see Bower (2015).

Results

Study characteristics

Of the 42 A&H studies, the sub-field of languages accounts for 36 studies (83.3%) (Appendix C). English was the language most often researched (64.8%, $n = 27$), with six studies investigating other A&H subjects, for example anthropology (Fukuzawa & Boyd, 2016) or women's health and human rights (Carver, Davis, Kelley, Obar, & Davis, 2012). The 42 studies were published in 41 articles, as Carver et al. (2012) reported on four independent studies, two of which investigated disciplines pertaining to A&H. Studies in this sample are cited 30.95 times ($SD = 44.62$) on average.

Geographical characteristics

A total of 21.4% ($n = 9$) were undertaken in Taiwan, followed by China (16.7%, $n = 7$) and the United States (12.0%, $n = 5$) (Figure 2). This means a clear under-representation of the United States in the field of A&H when compared to the overall sample (-28.4%). Less striking, but similar, this under-representation also applies to European countries such as the United Kingdom (-10.1%), Spain (-4.0%), and Turkey (-4.0%). Compared to the overall sample, it is the east Asian industrialised countries of Taiwan (17.0%), China (15.7%), and Japan (9.5%) that are strikingly over-represented compared to other fields, so that it can be concluded that the field of A&H consists primarily of studies on language learning in east Asian advanced economies.

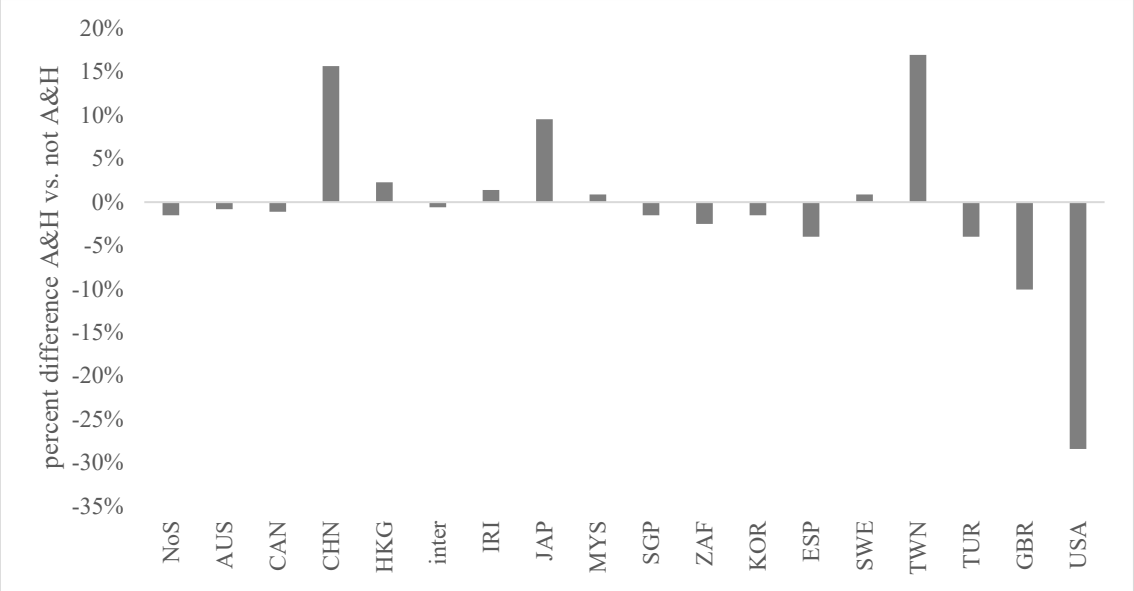

Figure 2. Percentage deviation from the average relative frequencies of articles per country (≥ 3 articles in the overall sample).
Note. NoS = not stated; AUS = Australia; CAN = Canada; CHN = China; HKG = Hong Kong; inter = international; IRI = Iran; JAP = Japan; MYS = Malaysia; SGP = Singapore; ZAF = South Africa; KOR = South Korea; ESP = Spain; SWE = Sweden; TWN = Taiwan; TUR = Turkey; GBR = United Kingdom; USA = United States of America

Half of the studies (50%, $n = 21$) took place in a blended learning format, with purely online settings used in 23.8% ($n = 10$) and face-to-face settings used in 19.0% ($n = 8$). However, four studies did not allow for identification of the mode of delivery used (9.5%, $n = 4$). Compared to the non- A&H sample, the share of blended learning is higher in A&H by 6.2%, whilst online and face-to-face delivery occur less often (see Figure 3). The share of studies not specifying their mode of delivery is higher by 5.5% in the A&H sample and reflects the need for further explanation of study context within future empirical research in the field.

Social collaborative learning (SCL) was employed in 76.2% ($n = 32$), and with 38.1% ($n = 16$), self-directed learning (SDL) was used in less than half of the studies. In another three studies (14.3%), the learning

scenario was not specified. Game-based learning (GBL) was used in two studies (4.8%) and personal learning environments (PLE) in one (2.4%). In order to determine how often learning scenarios occurred together, the number of common occurrences (p_{AB})were calculated relative to the maximum possible number of common occurrences. In concrete terms, this means that in a contingency table, the cell that indicated how often two learning scenarios occurred together is used ($A^+ \wedge B^+$) and the number in this cell was determined by the smaller number of respective learning scenarios (A $\wedge$ B). Expressed as a formula:

$$p_{AB} = \frac{A^+ \cap B^+}{\min\{A, B\}}$$

Equation 1.

In 56% of possible cases, SCL and SDL appear in combination (n = 9). Half of the studies using GBL were combined with SDL or SCL, with the study using PLE also having included SDL (Table 2). In the field of A&H, SCL appears 21.1% more often than it does in the overall sample, whereas SDL occurs less often, by 6.2%, than it does in the overall sample.

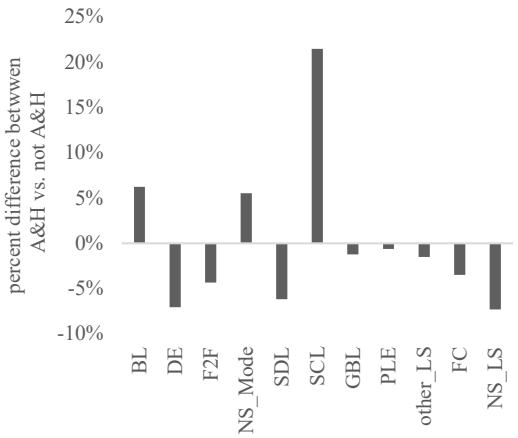

Figure 3. Percentage deviation from the average relative frequencies of mode of delivery (n = 42).
Note. BL = blended learning; DE = distance education; F2F = face-to-face; NS_Mode = not stated; SDL = self-directed learning; SCL = social collaborative learning; GBL = game-based learning; PLE = personal learning environments; other_LS = other learning scenario; FC = flipped classroom; NS_LS = learning scenario not stated

Study population

Interestingly, 31.0% of studies in this sample do not specify the study level of students. However, most studies (59.5%, n = 25) were conducted with undergraduate students, whilst only five studies researched graduate students (11.9%), and one study included both undergraduate and postgraduate students (Carver et al., 2012). This distribution of study levels is significantly different from the distribution in the overall sample ($\chi^2_{(df=3)}$ = 9.346, p < 0.05). However, upon exclusion of the studies not specifying their study level, it is evident that there are fewer courses with both graduate and undergraduate students.

Controlling for the studies not specifying study level, the share of courses at postgraduate level in A&H is at 3.4% and in the overall sample at 12.7% of studies. Controlling for this, the share of postgraduate courses in A&H is lower by 12.2% than in the overall sample, whereas the share of undergraduate courses is almost equal between A&H and the overall sample (higher by 2.9% in A&H). However, these differences are not significant ($\chi^2_{(df=2)}$ = 2.523, p > 0.05) and might also have arisen due to differently structured higher education systems across countries, which is not reflected in the coding of the studies.

Table 2
Co-occurrence of learning scenarios across the sample (n = 42)

	SDL	SCL	GBL	PLE	Other_LS	FC	NS_LS
Sum A&H	16	32	2	1	0	0	3
SDL		0.56	0.5	1			0
SCL	0.43		0.5	0			0
GBL	0.25	0.33		0			0
PLE	0.50	0.50	0				0
Other_LS	0.33	0.33	0	0			
FC	0.57	0.57	0	0	0		
NS_LS	0	0	0	0	0	0	
Sum not A&H	89	110	12	6	3	7	29

Note. SDL = self-directed learning; SCL = social collaborative learning; GBL = game-based learning; PLE = personal learning environments; Other_LS = other learning scenario; FC = flipped classroom; NS_LS = learning scenario not stated

Technology tools used

Looking at the frequency of EdTech tools, text-based tools were used most frequently (71.4%, *n* = 30), followed by knowledge organisation and sharing tools (35.7%, *n* = 15) and multimodal production tools (28.6%, *n* = 12). Website creation tools and learning software were each used in 19.0% of studies (*n* = 8), assessment tools and social networking tools appeared in 14.3% of studies (*n* = 6), and mobile learning and specific hardware (e.g. iPads) were explored in 9.5% of studies (*n* = 4) across the A&H sample.

In order to determine how often tools occurred together, the same method as that used in learning scenarios was used (Equation 1). In 93% of cases, text-based tools were used jointly with another technology, and in 100% of cases when assessment tools were being used (Table 3). Text-based tools and learning software were used together in 88% of possible cases, and knowledge organisation and sharing tools and assessment tools in 83% of possible cases. Comparing these results with the non- A&H studies, it is evident that text-based tools were used in A&H 17.7% more often, as were website creation tools (8.6%). A striking difference between the two samples exists for learning software, which was used almost exclusively in A&H (Figure 6). Out of the 201 studies that constitute the non-A&H sample, only one study (Gleason, 2012) used learning software. Thus, its share in A&H is higher by 18.6%. Social networking tools were also frequently used in A&H (6.8%), whilst assessment tools (-15.1%) and multimodal production tools (-9.7%) were used less frequently.

Methodological characteristics

Solely quantitative methods were used in 40.5% of studies (*n* = 17), followed closely by 38.1% combining both qualitative and quantitative methods (*n* = 16), with the remaining 21.4% relying on solely qualitative methods (*n* = 9). This means that the share of mixed methods is higher by 4.3% than in the overall sample, whilst the shares of qualitative (-2.0%) and quantitative studies (-2.3%) are slightly smaller. The differences are, however, not significant ($\chi^2_{(df=3)}$ = 0.284). The most frequently used data collection method was surveys (see Table 4), followed by ability tests and observations, which included behavioural observation of student participation online, examined e.g. through the number of posts in discussion forums (e.g., Kenny, 2008).

Similar to the overall sample (see Bond et al., 2020), document analysis was only used in 10 (24%) A&H studies. Peterson (2012), for example, captured the chat logs of ESL students in Second Life and conducted a discourse analysis, in order to explore how students interacted and whether use of the virtual world promoted increased target language use. The majority of surveys were self-made and focused on, for

example student satisfaction (e.g., Orawiwatnakul & Wichadee, 2016), student perceptions of the EdTech used (e.g., Mejia, 2016) or course evaluations (e.g., Peterson, 2012), or were adapted from other studies (e.g., Lu, Hou, & Huang, 2010).

Table 3
Co-occurrence of tools across the sample (n = 42) (≥ 3 articles)

	TBT	MPT	WCT	KO&S	DAT	DST	AT	SNT	SCT	ML	MOOCs	VW	LS	OL	Hardware	E-tutors	Games
Sum A&H	30	12	8	15	0	0	6	6	5	4	0	2	8	0	4	2	0
TBT		0.75	0.63	0.93			1.00	0.67	0.80	0.75		1.00	0.88		0.50	1.00	
MPT	0.57		0.25	0.33			0.50	0.33	0.40	0.50		0.00	0.25		0.50	0.00	
WCT	0.33	0.33		0.38			0.00	0.50	0.20	0.00		0.00	0.13		0.00	0.00	
KO&S	0.69	0.53	0.52				0.83	0.17	0.20	0.50		0.00	0.25		0.50	0.50	
DAT	0.00	0.00	0.00	0.50													
DST	1.00	1.00	1.00	1.00	0.00												
AT	0.51	0.42	0.10	0.49	1.00	1.00		0.00	0.20	0.00		0.00	0.17		0.25	0.00	
SNT	0.60	0.20	0.20	0.53	0.00	0.00	0.00		0.00	0.00		0.00	0.17		0.00	0.00	
SCT	0.64	0.64	0.18	0.45	0.00	1.00	0.36	0.18		0.25		0.00	0.00		0.25	0.00	
ML	0.17	0.33	0.17	0.50	0.00	0.00	0.17	0.17	0.00			0.00	0.25		0.25	0.00	
MOOCs	1.00	0.67	0.33	0.67	0.00	0.00	0.33	0.33	0.00	0.00							
VW	0.38	0.38	0.06	0.19	0.00	0.00	0.31	0.00	0.18	0.17	0.00		1.00		0.00	0.00	
LS	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	
OL	0.50	0.50	0.10	0.40	0.00	0.00	0.50	0.10	0.00	0.17	0.00	0.00	0.00				
Hardware	0.36	0.45	0.18	0.45	0.00	1.00	0.18	0.00	0.36	0.17	0.00	0.00	0.00	0.00		0.00	
E-tutors	0.33	0.00	0.00	0.17	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.17	1.00	0.00	0.00		
Games	0.00	0.33	0.00	0.33	0.50	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum not A&H	108	77	21	89	2	1	59	15	11	6	3	16	1	10	11	6	3

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; DAT = data analysis tools; DST = digital storytelling tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; VW = virtual worlds; LS = learning software; OL = online learning

Table 4
Data collection methods used

Method	*n*	Percentage
Surveys	23	54.8%
Ability tests	16	38.0%
Observations	11	26.2%
Document analysis	10	23.8%
Interviews	7	16.6%
Focus groups	4	9.5%

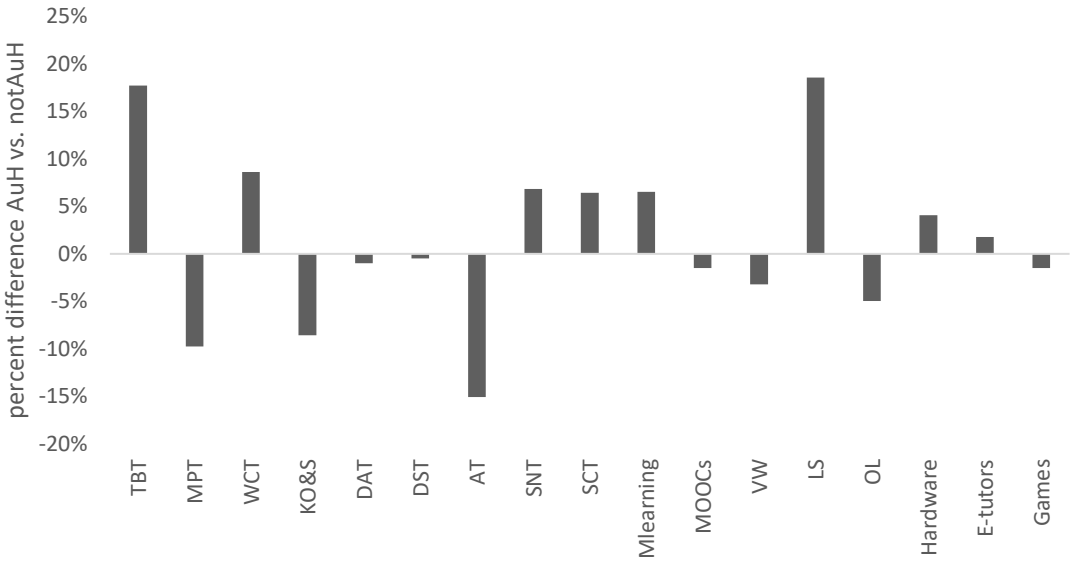

Figure 6. Percentage difference between A&H and non- A&H studies (n = 42)
Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; DAT = data analysis tools; DST = digital storytelling tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; MLearning = mobile learning; VW = virtual worlds; LS = learning software; OL = online learning.

Theoretically grounding research on student engagement and educational technology

Only two studies (4.8%) provided a definition of student engagement (Fukuzawa & Boyd, 2016; Lu & Churchill, 2014). Fukuzawa and Boyd (2016, p. 1) cited a definition by Smith, Sheppard, Johnson, and Johnson (2005, p. 87), that student engagement means "the frequency with which students participate in activities that represent effective educational practice". Lu and Churchill (2014) drew on a definition by Chapman (2003), and then focused on social and cognitive engagement. A theoretical framework was applied in 20 studies (47.6%), with constructivism referred to in four studies (Garcia-Sanchez & Rojas-Lizana, 2012; Lu & Churchill, 2014; Lu et al., 2010; Shi & Luo, 2016), social constructivism in two (Yang, Gamble, & Tang, 2012; Zhang, Song, Shen, & Huang, 2014) and socio-cultural theory in two studies (Lin & Yang, 2013; Peterson, 2009). Other studies drew on Bandura's theory of social learning (Carver et al., 2012), social presence theory (Yildiz, 2009) and technological pedagogical content knowledge (TPCK) (Asoodar, Marandi, Atai, & Vaezi, 2014). Specific to language learning in particular, Smith and Craig (2013) drew on the "theoretical framework of learner autonomy (LA) [which] is informed by principles underpinning CALL" (p. 2) and Grgurovic and Hegelheimer (2007) used interactionist second language acquisition theory.

Student engagement and EdTech in the field of arts and humanities

Behavioural engagement was by far the most prevalent dimension (Table 5), followed by cognitive and affective engagement, and in 50% (n = 21) of studies, all three dimensions of student engagement were identified. Another 19% (n = 8) found two dimensions, and the remaining 31% (n = 13) indicated one dimension of engagement. The six most frequently cited facets of student engagement were participation/involvement/interaction, achievement, positive interactions with peers & teachers, enjoyment and motivation, exactly replicating the top four student engagement indicators from the overall sample.

Two studies (4.8%) found that using EdTech enhanced engagement overall, without specifying which dimensions and/or facets it referred to, which were then coded separately to the other facets. For example, in Cheung's (2015) study of mobile learning in undergraduate language study, students were asked to rate the question "I think my level of engagement using the mobile learning module for language learning was high", from *strongly disagree* to *strongly agree*.

Table 5
Student engagement frequency descriptive statistics

	Frequency	Percentage	*M*	*SD*
Behavioural Engagement	38	90%	1.63	0.79
Affective Engagement	24	57%	3.25	2.07
Cognitive Engagement	28	67%	1.79	1.20

Behavioural engagement and educational technology

The most frequently reported dimension of engagement was behavioural (Table 6), with participation/interaction/involvement the most cited facet (52.4%, $n = 22$), which was particularly present in studies using website creation tools (particularly blogs) and mobile learning (75%), closely followed by assessment tools (Table 7). Studies often referred to the increased collaboration that online tools afforded students, as well as the ability for students to see how others constructed their questions and responses, which then enabled them to use the modelled language in their own contributions (Yang & Hsieh, 2015). This was particularly helpful in a bilingual blog between undergraduate students at an Australian and a Spanish university, where students could read the contributions of all participating students, which "persuaded them to be more careful in their writing" (Garcia-Sanchez & Rojas-Lizana, 2012, p. 367), and which resulted in most students interacting with each other beyond the required amount. This ability for students to interact online, without the pressure of talking face-to-face, enhanced student confidence (Yang & Hsieh, 2015; Yildiz, 2009), as did using the target language to describe their everyday life within language courses (Mejia, 2016). Students were also more likely to interact and respond to student discussion forum posts in a Japanese ESL course, when students replied to each others' posts (Nielsen, 2013), which was found to be more important than how often the teacher contributed.

Table 6
Top five engagement facets across the three dimensions

Rank	Behavioural engagement	*n*	%	Affective engagement	*n*	%	Cognitive engagement	*n*	%
1	Participation/ interaction/ involvement	22	52.4%	Positive interactions with peers/teachers	14	33.3%	Learning from peers	8	19.0%
2	Achievement	17	40.5%	Enjoyment Motivation	10	23.8%	Self-regulation	7	16.7%
3	Confidence	6	14.3%	Interest	7	16.7%	Deep learning	6	14.3%
4	Assume responsibility	5	11.9%	Enthusiasm	6	14.3%	Critical thinking Understanding	5	11.9%
5	Study habits	3	7.1%	Sense of connectedness Satisfaction Excitement	5	11.9%	Staying on task/focus	4	9.5%

Three of the four studies that focused on mobile learning indicated that participation/interaction/involvement was positively affected as a result (Cheung, 2015; Ramamuruthy & Rao, 2015; Shi & Luo, 2016), with 45% of students in Cheung's (2015) study *agreeing* or *strongly agreeing* that mobile learning can enhance their overall academic performance, and foreign language students who used WeChat in Shi & Luo's (2016) study scored significantly higher ($t = 2.05$, $P = 0.039 < 0.05$) than those who did not. Achievement, however, was especially found when synchronous collaborative tools, multimodal production tools (MPT) and assessment tools are used, with knowledge organisation and sharing tools and MPT having relatively high values as well. In a study examining the use and effect of voice over instant messaging on English speaking proficiency in Taiwan using Skype (Yang et al., 2012), the use of structured discussions facilitated by English teaching assistants was particularly effective, as they further scaffolded learning for students.

Table 7
Relative frequency (percentages) of behavioural engagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KO&S	AT	SNT	SCT	ML	LS	Hardware	Not A&H
Participation/ interaction/ involvement	52%	53%	50%	75%	60%	67%	50%	60%	75%	50%	50%	48%
Study habits	7%	10%	8%	13%	7%	0%	17%	0%	0%	38%	0%	8%
Confidence	14%	17%	8%	25%	13%	0%	17%	0%	25%	0%	25%	15%
Assume responsibility	12%	10%	0%	25%	7%	0%	17%	0%	0%	13%	25%	6%
Achievement	40%	40%	50%	25%	47%	50%	17%	60%	25%	38%	25%	44%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without arts and humanities

Affective engagement and educational technology

Affective engagement was noted through 10 different facets in relation to using EdTech (see Table 8), with positive interactions with peers/teachers the most cited (33.3%, n = 14), and particularly prevalent when using website creation tools and synchronous collaboration tools. Interestingly, affective engagement was seldom reported when studies used assessment tools or m-Learning, although m-Learning did promote enjoyment and motivation in half of the studies using it. In contrast, when using website creation tools, affective engagement was reported relatively often, especially touching upon the facets of positive interactions with peers/teachers, enjoyment and motivation. In comparison to the overall sample, motivation was found more frequently in A&H, whilst no other striking differences exist between the two samples.

Positive interactions with peers/teachers were identified in the studies by Garcia-Sanchez & Rojas-Lizana (2012) and Peck (2012), based on how students addressed one another in a friendly manner in an international, blog-supported language exchange course (Garcia-Sanchez & Rojas-Lizana, 2012) or greeting their instructor more informally than would generally happen in a university course (Peck, 2012). Using blogs to provide out of class peer feedback on each other's EFL writing was very conducive to fostering increased collaboration for in-class activities of Chinese undergraduates (Zhang et al., 2014).

Students from the Open University of Hong Kong evaluated mobile learning to be both motivating for self-study and interesting, with 66% (n = 40) stating that they (strongly) agreed with this statement, and 86 out of 87 students in the study by Garcia-Sanchez and Rojas-Lizana (2012) confirmed that the use of blogs motivated them. Motivation, however, was also fostered through a continuously present teacher in the web-based classroom (Lopera Medina, 2014), peer comments that refocused students on their written reflections, and artifacts made available to the class online (Lu & Churchill, 2014), as well as students producing their own videos in EFL learning, to show both their creativity as well as language skills (Mejia, 2016). One student in the third study by Carver et al. (2012) commented that her level of enjoyment increased during and due to contributing to a joint Wikipedia entry "because of working on something that was not limited to our class" (p. 278) and also making it available to a larger audience. Tschirhart and Rigler (2009) found that interactive language learning materials were enjoyed by most students in two different cohorts and were perceived helpful for their learning.

Table 8
Relative frequency (percentages) of affective engagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KO&S	AT	SNT	SCT	ML	LS	Hardware	not A&H
Enthusiasm	14%	17%	17%	38%	20%	0%	0%	20%	0%	25%	0%	10%
Interest	17%	20%	25%	25%	20%	17%	0%	20%	25%	25%	25%	15%
Sense of belonging	10%	10%	0%	38%	13%	0%	33%	0%	0%	0%	0%	3%
Positive interactions with peers & teachers	33%	37%	33%	75%	33%	33%	50%	60%	0%	38%	25%	43%
Positive attitude about learning	10%	10%	0%	25%	13%	0%	17%	0%	0%	13%	25%	16%
Sense of connectedness	12%	13%	8%	50%	13%	0%	33%	20%	0%	13%	0%	10%
Satisfaction	12%	10%	8%	38%	7%	0%	0%	20%	0%	13%	0%	8%
Excitement	12%	17%	17%	38%	0%	0%	33%	20%	0%	13%	0%	7%
Enjoyment	24%	27%	33%	50%	20%	0%	17%	20%	50%	50%	25%	22%
Motivation	24%	27%	25%	50%	33%	17%	17%	20%	50%	38%	25%	11%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without Arts & Humanities

Cognitive engagement and educational technology

Whilst cognitive engagement was found slightly more frequently than affective engagement (Table 5), the frequency was more dispersed across the eight facets and technology tool types (Table 9). The most often identified facet was learning with peers, which occurred especially when studies used website creation tools and learning software, although the study by Lu and Churchill (2012) found that social interactions in the course did not ultimately lead to higher cognitive engagement per se. Weaker students were able to benefit from stronger ones when applying peer questioning in online discussion boards (Yang & Hsieh, 2015), and learning from peers also happened the other way around, with tutors in EFL classes learning from their online tutees (Lin & Yang, 2013) in the sense of feeling more prepared to be a teacher and even expanding their English vocabulary.

Self-regulation was found in studies, for example, where students' positive attitude towards technology, stemmed from the appreciation of learning by doing it on their own (Alshaikhi & Madini, 2016). The integration of a self-study centre, as well as a reflective diary and mechanisms to track one's individual learning, led students to realise that "to find one's own way to study" (Smith & Craig, 2013, p. 9) is a central feature of CALL. Deep learning was detected through the content analysis of student group discussions (Kenny, 2008), with findings from an investigation into the knowledge construction patterns of Taiwanese EFL students revealing that knowledge construction in online discussion occurs in relation to students' learning styles; with learners that show Serial style, rather than Holist style, showing more variation in their collaborative construction of knowledge and negotiation of meaning and disagreement (Wu, 2016).

Critical thinking was found to increase both in an EFL class offered in a traditional setting, but much more so in a Facebook-enhanced one (d_{ppc2} = 0.545) (Morris, 2008), after students were trained to answer questions developed on a revised Bloom's Taxonomy scale (Pattanapichet & Wichadee, 2015). Installing courseware in the laboratory to enhance teacher-centered instruction, led students in the study by Tsai (2012) to develop more critical thinking skills in the sense that they reported to have improved "abilities of thinking, analysis and problem-solving" (p. 56). However, Cohen's d = .085 revealed no differences between the traditional and the enhanced settings.

Table 9
Relative frequency (percentages) of cognitive engagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KOS	AT	SNT	SCT	ML	LS	Hardware	not A&H
Deep learning	14%	13%	8%	0%	7%	17%	33%	20%	0%	0%	50%	19%
Self-regulation	17%	13%	25%	0%	13%	17%	33%	0%	0%	25%	0%	16%
Staying on task/focus	10%	13%	8%	25%	7%	0%	17%	20%	25%	25%	0%	9%
Positive perceptions of teacher support	7%	10%	17%	25%	7%	17%	17%	20%	0%	13%	0%	8%
Follow through/Care/ thoroughness	7%	10%	8%	13%	13%	0%	17%	0%	25%	0%	25%	7%
Learning from peers	19%	23%	8%	38%	13%	0%	17%	20%	0%	38%	0%	23%
Critical Thinking	12%	7%	8%	0%	0%	0%	33%	0%	25%	0%	0%	10%
Understanding	12%	13%	8%	0%	13%	17%	17%	20%	25%	13%	0%	4%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KOS = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without Arts & Humanities

Student disengagement and educational technology in the field of arts and humanities

Student disengagement (Table 10) was found considerably less often across the sample, which could be due to studies seeking to identify positive engagement, although this could also be potentially due to a form of publication or self-selection bias, due to infrequent publishing of studies with negative results. The three disengagement facets most often indicated were frustration (n = 5, 11.9%), half-hearted/task incompletion (n = 3, 7.1%), and pressured (n = 3, 7.1%).

Table 10
Student disengagement frequency descriptive statistics

	Frequency	Percentage	*M*	*SD*
Behavioural Disengagement	5	12%	2	1.41
Affective Disengagement	10	24%	1.6	0.84
Cognitive Disengagement	6	14%	1.5	0.84

Behavioural disengagement and educational technology

Behavioural disengagement was indicated by six facets (Table 11), with the most frequent of these being half-hearted/task incompletion (Table 12), which was the only facet identified in three or more studies. This was related to students not completing their share of the group work in a blended or online class respectively (Asoodar et al., 2014), not sufficiently contributing to group discussion forums (Wang, 2010) or using the provided forum, chat or e-mail only very superficially (Lopera Medina, 2014). In the case of group work in Wang (2010), groups were comprised of students from two different colleges, with students from one college posting more or less nothing, which in turn led the students from the other college to interact among themselves – thus, half-hearted participation did not stop interaction and dialogue, but rather gave it an unintended direction. When looking at the facets of unfocused/inattentive and distracted, it is noteworthy, albeit not surprising, that the Internet is cited as a prime reason for losing focus and being distracted, as one EFL student in a blended learning course pointed out (Zhang & Han, 2012). The authors conclude that students' ability to learn autonomously needs to be increased, as well as the provision of teacher guidance.

Table 11
Top five disengagement facets across the three dimensions

Rank	BD	*n*	%	AD	*n*	%	CD	*n*	%
1	Half-hearted/task incompletion	3	7.1%	Frustration	5	11.9%	Pressured	3	7.1%
2	Unfocused Distracted	2	4.8%	Disinterest Disappointment Worry/Anxiety Other	2	4.8%	Opposition/ Rejection Other	2	4.8%
3	Giving up Mentally withdrawn Poor conduct	1	2.4%				Unwilling	1	2.4%

Note. BD = Behavioural disengagement; AD = affective disengagement; CD = cognitive disengagement.

Table 12
Relative frequency (percentages) of behavioural disengagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KO&S	AT	SNT	SCT	ML	LS	Hardware	not A&H
Half-hearted/task incompletion	7%	10%	8%	13%	13%	17%	0%	20%	0%	13%	0%	8%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without Arts & Humanities

Affective disengagement and educational technology

Four affective disengagement facets were coded alongside other (Table 11), with frustration the most frequent (Table 13). Students were particularly frustrated by technical issues experienced with technology (Ducate, Anderson, & Moreno, 2011), such as Google docs being occasionally unstable and lagging during group work (Lin & Yang, 2013), and fellow students changing the background and font colours of online group spaces, which made writing uncomfortable for some (Asoodar et al., 2014). For one student, the lack of an option to hand in work without technology meant that "if you didn't have easy access to technology or had technological difficulties, you were disadvantaged" (Mejia, 2016, p. 90) and other students were worried that late submission as a result might mean incurring a penalty. Students using Second Life in an undergraduate ESL course found that interacting with fellow students could also be challenging, and noted the need for good typing skills, however they also felt that the setting was less stressful than a regular language class (Peterson, 2012).

Table 13
Relative frequency of affective disengagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KO&S	AT	SNT	SCT	ML	LS	Hardware	not A&H
Frustration	12%	17%	25%	13%	7%	0%	0%	20%	25%	13%	25%	14%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without Arts & Humanities

Students who were disinterested in using EdTech included those who were negative or cynical about the tools used, such as Ning (Peck, 2012). Students also expressed disappointment when interactions with peers were made difficult through technology, due to not being able to read a person's body language and interpret their meaning in messages (Yildiz, 2009). Students in a web-based graduate ESL course "expressed a high degree of anxiety when they did not receive an automated score from the exercises they had submitted" (Lopera Medina, 2014, p. 97), as some of the tasks had to be graded manually by the instructor, which was demotivating for students. Also causing concern for one student was the use of an interactive whiteboard in a beginners' Chinese course, as they did not want to embarrass themselves in front of other students (Xu & Moloney, 2011), and a lack of technology skills and experience with online communication within educational contexts caused difficulties for others (Lopera Medina, 2014; Wang, 2010).

Cognitive disengagement and educational technology

As with affective disengagement, there were only four facets of cognitive disengagement coded in this sample, alongside other (Table 11), with pressured the most cited (Table 14). Three studies that explored blended learning in ESL classes (Asoodar et al., 2014; Sun, 2014; Zhang & Han, 2012) found that students felt pressured because "they had to devote themselves to both the online environment and the classroom environment and they had to spend much more time on English learning, which was stressful for them" (Zhang & Han, 2012, p. 1967). This led one student to declare that "only in the traditional classroom, can I acquire basic English" (Sun, 2014, p. 90). Another student felt overwhelmed, as their lack of a computer at home meant they often had to go to the university campus, which "took a lot of [their] time" (Asoodar et al., 2014, p. 540), and the use of M-Learning in a face-to-face beginners' Spanish course was stressful for some students, as technical problems caused difficulties in handing up assignments (Mejia, 2016). Students were opposed to online group work in blended classes in two studies, as they preferred to "meet face-to-face" (Asoodar et al., 2014, p. 538), with students in a blended undergraduate Linguistics course "openly ridicul[ing]" (Peck, 2012, p. 83) the idea that they might develop offline friendships with fellow students, and unwilling to engage in online discussions with the lecturer.

Table 14
Relative frequency (percentages) of cognitive disengagement facets by technology type (in 3 or more articles)

	All	TBT	MPT	WCT	KO&S	AT	SNT	SCT	ML	LS	Hardware	not A&H
Pressured	7%	10%	25%	13%	13%	17%	0%	20%	25%	0%	25%	6%

Note. TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; LS = learning software; not A&H = the rest of the sample without Arts & Humanities

Discussion

Grounding arts and humanities research in theory and methodologies used

A common theme within research on student engagement has been the complexity of the construct, and in particular, its definition and measurement. This was particularly evident within the overall sample, but more so within this subset, as only two studies (5%) included a definition. Whilst arguments will most likely continue over the exact nature of student engagement, it is vital that each study investigating engagement includes a definition of their own understanding, in order to locate and frame their findings, and to ensure easier interpretation of results (Appleton et al., 2008; Christenson, Reschly, & Wylie, 2012). It is also advised that studies relate the aspects of engagement under investigation to the wider framework of student engagement (see e.g., Bond & Bedenlier, 2019), and to further consider the issue of disengagement when using EdTech, given that engagement and disengagement exist on a continuum (Pekrun & Linnenbrink-

Garcia, 2012), and few studies within this sample explored the negative effects of EdTech, despite the valuable insight for educators that such investigations could provide.

More than half of the studies in this sample did not use a theoretical framework, which mirrors current conversations and concerns within the wider field of EdTech (e.g., Crook, 2019; Hew, Lan, Tang, Jia, & Lo, 2019). Studies that did, drew heavily on constructivism and socio-cultural theories of learning and practice, with three quarters using social collaborative approaches, also reflective of the trend in EdTech research (Bond, Zawacki-Richter, & Nichols, 2019). Interestingly, given the high number of studies relating to language learning in the sample, only two studies drew on language specific theories. This perhaps emphasises the importance now placed within research on language within social contexts and language learning as a social endeavour (Chapelle, 2009; Thorne, Black, & Sykes, 2009), or, as Garrett (2009) suggests, perhaps this is due to the normalisation of technology use within higher education.

Whilst the number of studies that used qualitative methods was not greatly different to the overall sample, there were nevertheless a smaller amount of studies that used, for example, interviews and focus groups. Given the large number of studies that used text-based tools (71.4%), and the focus of this sample on language learning and use, it was also surprising that fewer studies used document analysis. As student engagement is complex, it is important to also use data collection methods that provide thick descriptions of student and teacher perceptions of using EdTech, rather than solely relying on quantitative data, which often focuses more on behavioural engagement (Fredricks et al., 2004; Henrie, Halverson, & Graham, 2015). This more quantitative approach towards EdTech in A&H could perhaps be partially explained in this sample, given the large amount of Asian studies present, and the fact that quantitative methods were heavily used in Asian countries in the overall sample. Caution is advised, however, with using self-developed surveys over previously validated instruments, as this can pose questions of validity and reproducibility (Döring & Bortz, 2016).

There were also issues of missing contextual data within the studies in this sample. Without full contextual information in empirical research, readers are unable to fully gauge whether studies could be applied to their own context (Bond, Zawacki-Richter, & Nichols, 2019; Pérez-Sanagustín et al., 2017), and more explicit study details should be included in future research.

Educational technology and student engagement

The synthesised findings from the studies in this sample can be broadly read as an affirmation of the argument that the mere use of technology as such does not make learning better, but is rather only one factor in the design of a course or module (Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011). This can be gathered from the fact that authentic and meaningful tasks, such as using Wikipedia to create a contribution extending the classroom (e.g., Carver et al., 2012) were perceived by students to be more enjoyable or that collaborative activities were found to be effective when using e.g. digital flashcards in language learning (Hung, 2015).

Whilst blended learning was used in half of the studies, students in language learning courses (e.g., Zhang & Han, 2012) reported being somewhat opposed to the online parts of the course, feeling pressured or overwhelmed, and preferring the face-to-face environment for learning. However, studies also found that using blogs and discussion forums allowed students to see examples of other students' work and therefore model language in their own responses, which reduced anxiety. They were also more likely to contribute more if other students responded to their posts. Interestingly, whilst affective engagement appeared less often in this A&H sample, affective disengagement occurred more frequently than behavioural and cognitive disengagement (see Table 10). Practitioners, therefore, need to be particularly mindful of the potential for students to become disengaged, and to be proactive in taking preventative measures. Frustration was primarily related to technical problems and failures (e.g., Ducate et al., 2011), such as unstable connections or programs not functioning as expected (e.g., Lin & Yang, 2013), and disengagement also particularly manifested in students not completing group work or contributing to discussion forums (e.g., Wang, 2010). If technology and online learning are to be used in a course, it is therefore important to make both tasks and the use of technology valuable to students and conducive to learning goals. It is also important to then ensure that students understand the reasons behind utilising EdTech, are taught how to use the tools involved, and are encouraged to engage with their peers as much as possible.

Conclusion

This study synthesised 42 studies in the field of A&H, the majority of which addressed language learning, and ESL/EFL in particular. A considerable number of studies were undertaken in East Asian countries, with Taiwan contributing seven studies alone. This raises questions as to how this heavy regional and disciplinary focus can be explained, as well as how EdTech is employed in other disciplines within A&H, such as history, performing arts or religious studies (UNESCO, 2015). Also, given that regions such as continental Europe, Africa and Oceania were only minimally present in this sample, further investigation is encouraged within those regions, as learning is rooted in cultural contexts and occurs against specific institutional background and learner characteristics. With more countries, and a broader range of institutional settings and disciplines explored, a more holistic picture can potentially be gained of how EdTech can be effectively used to enhance student engagement.

The authors sought to adhere to the principles of conducting a systematic review as closely as possible. However, the implicit bias of having searched only English language databases and the explicit restriction to journal articles from the years 2007 to 2016, constitute a limitation to the results of this study. In order to capture more recent and emerging technologies, including artificial intelligence, it is suggested that this review be updated accordingly in the future.

Funding

This work was supported by the Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research - BMBF) [grant number 16DHL1007].

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Corresponding author: Melissa Bond, melissa.bond@uni-oldenburg.de

Please cite as: Bedenlier, S., Bond, M., Buntins, K., Zawacki-Richter, O., & Kerres, M. (2020). Facilitating student engagement through educational technology in higher education: A systematic review in the field of arts and humanities. *Australasian Journal of Educational Technology, 36*(4), 126-150. https://doi.org/10.14742/ajet.5477

Appendix A
Facets of engagement and disengagement

Facets of student engagement

Cognitive engagement	Affective engagement	Behavioural engagement
Purposeful	Enthusiasm	Attendance
Integrating ideas	Sense of belonging	Study habits
Doing extra to learn more	Satisfaction	Developing agency
Follow through/care/thoroughness	Curiosity	Participation/involvement
Positive self-perceptions & self-efficacy	Sees relevance	Developing multidisciplinary skills
Preference for challenging tasks	Sense of connectedness to school/university	Attention/focus
Teaching self & peers	Positive interactions with peers & teachers	Time on task/staying on task/persistence
Use of sophisticated learning strategies	Positive attitude about learning/values learning	Interaction (peers, teacher, content, technology)
Positive perceptions of teacher support	Interest	Accessing course material
Critical thinking	Enjoyment	Identifying opportunities and challenges
Setting learning goals	Sense of wellbeing	Supporting & encouraging peers
Self-regulation	Pride	Attempting
Operational reasoning	Vitality/zest	Homework completion
Trying to understand	Excitement	Positive conduct
Reflection	Desire to do well	Action/initiation
Concentration/focus	Feeling appreciated	Confidence
Deep learning	Manages expectations	Assuming responsibility
Learning from peers		Asking teacher or peers for help
Justifying decisions		

Facets of student disengagement

Cognitive disengagement	Affective disengagement	Behavioural disengagement
Aimless	Boredom	Procrastination
Unwilling	Anger	Half-hearted
Apathy	Shame	Mentally withdrawn
Helpless	Dislike	Absent
Opposition/rejection	Disinterest	Giving up
Hopeless	Sadness	Unfocused/inattentive
Resigned	Self-blame	Burned out/exhausted
Avoidance	Disappointment	Poor conduct
Pressured	Frustration	Restlessness
	Worry/anxiety	Distracted
	Overwhelmed	Unprepared
		Task incompletion

Sourced from a range of literature:
Appleton, Christenson, & Furlong, 2008; Filsecker & Kerres, 2014; Fredricks et al., 2016; Fredricks, Blumenfeld, & Paris, 2004; Henrie, Halverson, & Graham, 2015; Kahu, 2013; Mahatmya, Lohman, Matjasko, & Farb, 2012; Martin, 2012; Redmond, Heffernan, Abawi, Brown, & Henderson, 2018; Reeve, 2012; Skinner & Pitzer, 2012; Zepke, 2014

See also Bond & Bedenlier, 2019, p. 3

Appendix B
Educational technology tool typology, based on Bower (2016)

Text-based tools	Multimodal production tools	Website creation tools	Knowledge organisation and sharing	Data analysis tools
Discussion forums Collaborative writing tools Readings Newsletter Text RSS Interactive textbook Annotation tools Email Chat Instant messaging Wikis	Animations Tutorials Recorded lectures Videos Podcast/Vodcast Screencast Authoring tools Voice recorder	Blogs ePortfolios	Cloud storage Bookmarking LMS Diary tool in Moodle	Learning analytics dashboard

Digital Storytelling tools	Assessment tools	Social networking tools	Synchronous collaboration tools	Mobile learning
Storyboards	eAssessment Quizzes ARS Open badges	Social platforms Microblogging	Audio-Video conferencing	Apps mLearning

Virtual worlds	Learning software	Online learning	Hardware	Peer e-tutors
Virtual lab Simulations Virtual worlds	Language learning software Presentation software	Homepage	Tablets Hardware Interactive whiteboards	Peer e-tutors

Games
Games

Appendix C
Arts and humanities study characteristics in this sample

Author	Year	Journal	Citations	Field of Study
Alshaikhi & Madini	2016	English Language Teaching	2	English
Asoodar et al.	2014	Computers in Human Behavior	7	English
Carver et al. (Study 1)	2012	Learning and Media	7	Introduction to the Study of the Arab World
Carver et al. (Study 2)	2012	Learning and Media	7	Woman Health & Human Rights
Chen & Chang	2014	Interactive Learning Environments	28	Chinese
Cheung	2015	Communications in Computer and Information Science	11	Various languages
Ducate et al.	2011	Foreign Language Annals	77	Various languages
Fukuzawa & Boyd	2016	The Canadian Journal for the Scholarship of Teaching and Learning	5	Anthropology
García-Sánchez & Sol Rojas-Lizana	2012	Technology, Pedagogy and Education	23	English
Grgurović & Hegelheimer	2007	Language Learning and Technology	175	English
Huang & Yang	2015	Journal of Educational Computing Research	18	English
Hung	2015	English Language Teaching	13	English
Kenny	2008	Interpreter and Translator Trainer	19	Translation studies
Krasnova & Vanushin	2016	International Journal of Emerging Technologies in Learning	9	English
Lin & Yang	2013	English Teaching: Practice and Critique	20	English
Lopera Medina	2014	PROFILE: Issues in Teachers' Professional Development	13	English
Lu & Churchill	2014	Interactive Learning Environments	50	Literature
Lu et al.	2010	International Journal of Education and Development using Information and Communication Technology	47	English
Mejia	2016	Lfe-Revista De Lenguas Para Fines Especificos	1	Spanish
Nielsen	2013	JALT CALL Journal	11	English
Orawiwatnakul & Wichadee	2016	Turkish Online Journal of Educational Technology	5	English
Pattanapichet & Wichadee	2015	Turkish Online Journal of Distance Education	7	English
Peck	2012	Asian Social Science	21	Linguistics
Peterson	2012	Recall	76	English
Peterson	2009	Computer Assisted Language Learning	83	English
Ramamuruthy & Rao	2015	Malaysian Online Journal of Educational Technology	11	English
Sauro	2009	Language Learning & Technology	225	English

Shi & Luo	2016	International Journal of Emerging Technologies in Learning	6	English
Smith & Craig	2013	CALICO Journal	20	English
Song & Liu	2013	International Journal on E-Learning	0	Literature
Sun	2012	CALICO Journal	11	English
Sun	2014	International Journal of Information Technology and Management	33	English
Tsai	2012	Journal of Educational Technology & Society	22	English
Tschirhart & Rigler	2009	Language Learning Journal	10	Foreign language
Wang	2010	Australasian Journal of Educational Technology	77	English
Wu	2016	Asia-Pacific Education Researcher	1	Chinese
Xu & Moloney	2011	Asian Social Science	25	Chinese
Yang et al.	2012	British Journal of Educational Technology	34	English
Yang & Hsieh	2015	Language Learning & Technology	2	English
Yildiz	2009	Journal of Studies in International Education	54	English
Zhang & Han	2012	Theory and Practice in Language Studies	16	English
Zhang et al.	2014	Australasian Journal of Educational Technology	18	English