Inkluderede studier i forskningsoversigten: Digital læringsteknologis potentiale for studerendes engagement

	Reference	Abstract
1	Antonio, A., & Tuffley, D. (2015). First year university student engagement using digital curation and career goal setting. *Research in Learning Technology*, *23*(1), 1-14.	The engagement of students is one of the most pressing issues facing higher education in the 21st century. Around the world, participation rates in tertiary education are on the rise and one of the key challenges facing educators is finding ways to engage these students. We present the results of a project that assesses the impact of an engagement strategy in which a cohort of students entering their first year of university (1) establish and maintain a clear goal of their ideal future career and (2) make use of a web-based digital curation tool to research and present their findings. The results demonstrate the effectiveness of the strategy, which could arguably be applied to a broad range of disciplines given that the majority of students today are technologically literate.
2	Badenhorst, C., & Mather, C. (2014). Blogging geographies. *Journal of Geography in Higher Education*, *38*(2), 193-207.	This paper responds to the call for research on the use of new information technologies in higher education contexts. This was done through a case study on the use of blogs in an advanced seminar class. The paper argues that the use of blogs provided a way of gauging how students were coming to terms with the course material and how they were engaging with the course texts. Intertextuality was used as a method of understanding how students engaged with the course. The analysis was based on blog postings, student comments, course evaluations and the instructor's reflective journal.
3	Bailey, S., Hendricks, S., & Applewhite, S. (2015). Student Perspectives of Assessment Strategies in Online Courses. *Journal of Interactive Online Learning*, *13*(3), 112-125.	Engaging professional adults in an online environment is a common challenge for online instructors. Often the temptation or commonly used approach is to mirror face-to-face strategies and practices. One premise of this study is that all strategies used in an online environment are assessment strategies, and as such should be considered for their value in measuring student experiences. This research study investigated student responses within a principal preparation course to the use of twelve assessment strategies that included: work samples, "Twitter" summaries, audio recordings, traditional papers, screencast/videos using "YouTube", group projects, open discussion, paired discussion, response to video, field experiences, quizzes, and interviews. The redesigned course used in this

		research allowed the researchers to experiment with both traditional and innovative strategies within an online environment to determine how students perceive the value of each assessment strategy. Student experiences were measured in terms of level of enjoyment, level of engagement, and the extent to which students believed the assessments would result in the creation of knowledge that could be transferred to future professional practice. The results indicate that students prefer assignments that are less traditional and which fully incorporate the technological tools available.
4	Balta, N., & Awedh, M. H. (2017). The Effect of Student Collaboration in Solving Physics Problems Using an Online Interactive Response System. *European Journal of Educational Research*, *6*(3), 385-394.	Advanced technology helps educational institutes to improve student learning performance and outcomes. In this study, our aim is to measure and assess student engagement and collaborative learning in engineering classes when using online technology in solving physics problems. The interactive response system used in this study is a collaborative learning tool that allows teachers to monitor their students' response and progress in real time. Our results indicated that students have highly positive attitude toward using the interactive response system as a tool in education in order to improve collaborative learning and student engagement in classes. Consequently, student-learning performance has been improved considerably, and technology was successfully incorporated in engineering classes.
5	Barber, W., King, S., & Buchanan, S. (2015). Problem based learning and authentic assessment in digital pedagogy: Embracing the role of collaborative communities. *Electronic Journal of E-Learning*, *13*(2), 59-67.	The purpose of this paper is to qualitatively examine the relationship between problem based learning, authentic assessment and the role of community in fostering learning in digital contexts. The authors used "Digital Moments" to create a meaningful learning environment and build the online class community. They then collaboratively developed assessment strategies and tools with students following problem-based learning methodologies. Given that the pace of information is rapid and changing, the authors argue that online learning must occur in a context that embraces these three concepts: 1. Students must be empowered through PBL to choose real world tasks to demonstrate their knowledge, 2. Students are allowed to choose the modality to represent that knowledge and participate in designing the tools for assessing that knowledge and 3. They do so in a supportive online community built through the sharing of Digital Moments. The paper chronicles the interconnection between problem based learning, authentic real world assessment tasks and a supportive online community. This

		resulted in developing learner autonomy, improving student engagement and motivation, greater use of meaningful self and peer assessments and shared development of collective knowledge. Further to this, it builds a foundation from which authentic assessment, student ownership of learning and peer support can occur in an ongoing way as learners make the important shifts in power to owning their learning and becoming problem-based inquirers in future courses. As a result, in order to fully embrace the online learning environment, we cannot limit ourselves to simple text based measures of student achievement. Stepping into this brave new world requires innovation, creativity and tenacity, and the courage to accept that as the nature of knowledge has evolved in the digital landscape, so must our means of assessing it.
6	Baum, E. J. (2013). Augmenting Guided-lnquiry Learning With a Blended Classroom Approach. *Journal of College Science Teaching*, *42*(6), 27-33.	Teaching strategies such as guided inquiry have long been reported to produce superior learning outcomes in postsecondary science education. Yet many teachers cite obstacles that prevent them from implementing the method. Students also often report negative attitudes toward guided inquiry, leading to a lack of student engagement and other troubling problems. This paper describes the implementation of a blended guided-inquiry course in chemistry for nonscience honors students that is intended to address some of the problems. Blended instruction proved to be less confusing and more economical of time than guided-inquiry instruction alone. No deterioration in student performance was noted, and student engagement proved to be exceptionally good. The approach described here is broadly applicable to the teaching of any science discipline.
7	Bawa, P. (2019). Using Kahoot to inspire. *Journal of Educational Technology Systems*, *47*(3), 373-390.	Today, there is growing interest in digital game-based learning due to the increase in the variety of educational and commercial games available. The literature indicates that digital educational games are effective at keeping learners engaged. This study examines the use of a digital educational game called Kahoot and supports the hypothesis that it can improve engagement and learning when immersed in traditional, lecture-based classrooms. The results of the mixed-methods study, using 96 undergraduates, suggest that learners' performance and engagement are enhanced when using Kahoot versus traditional teaching methods. In addition, practitioner and future research implications are also discussed.

8	Bigatel, P., & Edel-Malizia, S. (2018). Predictors of instructor practices and course activities that engage online students. *Online Journal of Distance Learning Administration*, *21*(1).	Much research on student engagement has recommended a variety of activities and instructor attitudes and behaviors that effectively engage online students such that they are more likely to persist in achieving their educational goals. This study asked online students how often they engaged in research-based effective activities in their courses and how much their instructors engaged them, but used prediction models to find out which activities and instructor attitudes/behaviors predicted the "most" engaging activities and instructor attitudes and behaviors. The purpose of this study was to provide instructors with the most effective strategies in terms of activities designed in their courses along with attitudes/behaviors to emulate that would have the most positive effect for engaging students. Such data would also inform the curriculum for faculty professional development.
9	Bledsoe, T. S., Harmeyer, D., & Wu, S. F. (2014). Utilizing Twitter and #Hashtags Toward Enhancing Student Learning in an Online Course Environment. *International Journal of Distance Education Technologies (IJDET), 12*(3), 75-83. http://doi.org/10.4018/ijdet.2014070106	The authors offer an answer to the research question, To what extent and in what ways is Twitter helpful to student learning when group hashtags are created and used in collaborative educational environments? Sixty-two students in a spring 2012 graduate online Research Methodology course worked individually and in groups to create discussions on topics of interest through Twitter posts and student-created hashtags. Student participants answered nine qualitative and quantitative questions concerning the Twitter/hashtag exercise and used collaborative blog pages to reflect on their experiences. A grounded theory approach was applied to classify data generated from the nine questions and blog postings. An analysis of the study's data resulted in the discovery of the following four themes: access to information, communication, class engagement, and general feedback. Based on these themes, nine recommendations are offered for maximizing the use of Twitter in an online environment for increased student engagement and learning.
10	Bolliger, D. U., & Armier Jr, D. D. (2013). Active learning in the online environment: The integration of student-generated audio files. *Active Learning in Higher Education*, *14*(3), 201-211.	Educators have integrated instructor-produced audio files in a variety of settings and environments for purposes such as content presentation, lecture reviews, student feedback, and so forth. Few instructors, however, require students to produce audio files and share them with peers. The purpose of this study was to obtain empirical data on graduate students' perceptions of the integration of student-generated audio files within the context of online, asynchronous course delivery and to gain an understanding of how this

		approach impacted their perceived satisfaction, engagement, connectedness, learning, and utilization. Results indicate students were satisfied with this instructional approach. The integration of student-generated audio files fostered their engagement and involvement, assisted them in effectively connecting and communicating with peers, and increased their learning. Some drawbacks to this approach are detailed.
11	Browne, C. J. (2019). Assessing the engagement rates and satisfaction levels of various clinical health science student sub-groups using supplementary eLearning resources in an introductory anatomy and physiology unit. *Health Education*, *119*(1), 2-17.	PurposeIntroductory anatomy and physiology provide a core knowledge base to students within clinical health science courses. Increased student numbers, as well as reduced access to laboratory-based cadaveric resources, have created a need for enhanced learning approaches to support learning. The streamlining of courses has also resulted in the need to effectively engage course sub-groups within large units. The purpose of this paper is to utilize the eLearning activities to investigate engagement and satisfaction levels within students undertaking an anatomy and physiology unit.Design/methodology/approachA total of 19 formative quizzes were made available to students. Online practical anatomy laboratories covered anatomical content, and physiology quizzes covered physiological content. Student engagement was compared using frequency analysis across students studying varying courses. Satisfaction was determined by analyzing student's feedback using frequency analysis.FindingsStudents accessed the learning activities 29,898 times over semester, with the peak access (37 percent) prior to the closed book exams. The resources were utilized primarily as an exam preparation tool rather than consistently throughout semester. Out of the various courses, the Paramedicine, Physiotherapy and Podiatry students were the most engaged, with the highest percent of "engaged/highly engaged" students. Students from various courses shared very similar views of the perceived benefit of the eLearning activities.Practical implicationsThese results indicated a difference in engagement levels between the students of various course sub-groups, and therefore suggests that the development of course-specific eLearning activities is necessary in large, streamlined units to achieve a more focused approach to support students' learning, engagement and success, so that positive and beneficial learning experiences are ensured for all students.Originality/valueThese results suggest that in the future,

		development of eLearning activities is necessary to achieve a more focused approach to support students' learning, engagement and success, so that positive and beneficial learning experiences are ensured for all.
12	Buckley, P., & Doyle, E. (2016). Gamification and student motivation. *Interactive learning environments*, *24*(6), 1162-1175.	The literature suggests that gamified learning interventions may increase student engagement and enhance learning. We empirically investigate this by exploring the impact of intrinsic and extrinsic motivation on the participation and performance of over 100 undergraduate students in an online gamified learning intervention. The paper makes a number of contributions. First, by synthesizing the literature the central concepts required for a learning intervention to be considered gamified are mapped and the development of an online gamified learning intervention is described. Second, the effect of gamification on learning outcomes is examined using a pre- and post-intervention survey. We find that gamified learning interventions have a positive impact on student learning. Third, our results show that while generally positive, the impact of gamified interventions on student participation varies depending on whether the student is motivated intrinsically or extrinsically. These findings will be of practical interest to teaching and learning practitioners working in a range of educational contexts, and at all levels of education, who wish to increase student engagement and enhance learning.
13	Buelow, J. R., Barry, T., & Rich, L. E. (2018). Supporting Learning Engagement with Online Students. *Online Learning*, *22*(4), 313-340.	University students increasingly desire that traditionally taught courses be made available online. While quality standards have been developed for the format and organization of online courses, professors often are left wondering what activities contribute to learning engagement for online students. To investigate this question, an online survey of all students taking an online course during a spring semester was conducted in one state university. A total of 417 students completed the survey, which included three standardized scale variables for learning engagement and two open-ended questions. Course activities that had statistical significance in relationship to students' reported learning engagement include those that changed their understanding of a topic or concept, connected their learning to societal problems, linked their learning to prior experiences and knowledge, and were interpreted as fun. A regression model using these variables, along with control variables of student age, gender, and out-of-

		school work, resulted in an R[superscript 2] of 0.484, suggesting that almost half of the variance in learning engagement can be explained via this model. Analysis of responses to the open-ended questions revealed that students found certain aspects of online discussions and interactive assignments engaging, especially those that prompted students with thought-provoking questions that relate to real-world situations and invited students to share diverse opinions and develop personal perspectives.
14	Burgoyne, S., & Eaton, J. (2018). The partially flipped classroom: The effects of flipping a module on "junk science" in a large methods course. *Teaching of Psychology*, *45*(2), 154-157.	Flipped classrooms are gaining popularity, especially in psychology statistics courses. However, not all courses lend themselves to a fully flipped design, and some instructors might not want to commit to flipping every class. We tested the effectiveness of flipping just one component (a module on junk science) of a large methods course. We compared two sections, one in a traditional format (n = 128) and the other in a flipped format (n = 139), based on students' academic performance and attitudes toward the class structure. Compared to students in the traditional lecture section, students in the flipped section performed significantly better on a quiz tied to the lecture content and rated their enjoyment of the exercise as higher. These findings demonstrate the utility of using partial flipped classroom techniques with large classes.
15	Butz, N. T., Stupnisky, R. H., Pekrun, R., Jensen, J. L., & Harsell, D. M. (2016). The impact of emotions on student achievement in synchronous hybrid business and public administration programs: A longitudinal test of control-value theory. *Decision Sciences Journal of Innovative Education*, *14*(4), 441-474.	Synchronous hybrid delivery (simultaneously teaching on-campus and online students using Web conferencing) is becoming more common in higher education. However, little is known about students' emotions in these environments. Although often overlooked, emotions are fundamental antecedents of success. This study longitudinally examined the role of students' emotions (enjoyment, anxiety, and boredom), perceptions of control, value, and success in synchronous hybrid learning environments. In particular, the investigation assessed students' self-reported enjoyment, anxiety, and boredom as predictors of their program achievement and successful technology use. Students were recruited from synchronous hybrid MBA and MPA programs. Control-value theory of emotions was used as the theoretical framework. Paired samples "t"-tests revealed that the achievement domain, compared to the technology domain, yielded higher mean scores for control, value, enjoyment, anxiety, and boredom. In addition, mixed ANOVAs indicated an interaction effect in which group

		means for program boredom were significantly higher for on-campus students than for online students. Intercorrelations in each domain showed that perceived success was positively related to enjoyment and negatively related to anxiety and boredom. Technology-related anxiety was also found to fully mediate the positive effect of control on perceived success in using technology.
16	Callahan, J. T. (2016). Assessing online homework in first-semester calculus. *Primus*, *26*(6), 545-556.	This paper describes and assesses the implementation of online homework in a first-semester calculus course. Comparing sections of the course before implementation to those after, we find statistically significant improvements in retention rates, measures of student engagement, and participation on homework. We do not, however, find statistically significant changes in the proportions of students passing the common final exam or earning a C grade or better for the course. We conclude with a discussion of qualitative aspects and implications of our implementation of online homework.
17	Campbell, C., & Monk, S. (2015). Introducing a learner response system to pre-service education students: Increasing student engagement. *Active Learning in Higher Education*, *16*(1), 25-36.	Described in this study is a learner response system (clickers) used with first-year undergraduate students in a small group setting. The aim of the project was to address issues faced by us all as we seek to improve class participation, as well as engage students in lectures and tutorials throughout the course. Data collection for this case study incorporated diary entries by the lecturer and student responses to the use of clickers and reflects both the course coordinator's journey through the process of introducing this new technology and changing students' responses as they engage with this technology. The article reports on the positive results particularly in relation to increased potential for clickers to be used as a teaching and learning tool. The significance of this study, however, lies in the recognition that pedagogical approaches need to be taken into consideration when planning for effective use of clickers as a tool for engaging students.
18	Camus, M., Hurt, N. E., Larson, L. R., & Prevost, L. (2016). Facebook as an online teaching tool: Effects on student participation, learning, and overall course performance. *College Teaching*, *64*(2), 84-94.	Online discussions are widely viewed as a valuable tool for encouraging student engagement and promoting interaction with course material outside of the traditional classroom. Strategies for conducting online discussions vary and are not confined to traditional, university-sponsored learning management systems (LMS). Social media platforms such as Facebook, which provide a variety of social benefits to students, might also represent a viable mechanism for educational information exchange and learning. Our

		study tested this proposition by comparing the effects of a Facebook-based and LMS-based online discussion forum on students' participation, achievement of learning goals, and overall course performance. Our findings suggest that different forums can affect classroom dynamics and student learning in different ways. While Facebook may be better at fostering student participation and encouraging peer-to-peer dialogue, the university-sponsored LMS may be a more effective tool for encouraging students to develop coherent arguments and apply course content in other contexts. Since this study shows that platform of an online discussion assignment matters, college instructors should consider the benefits and drawbacks of each platform before developing an online discussion assignment. Instructor choice of platform should depend on course content, instructor's teaching preferences, and online discussion assignment goals.
19	Christopoulos, A., Conrad, M., & Shukla, M. (2018). Interaction with educational games in hybrid virtual worlds. *Journal of Educational Technology Systems*, *46*(4), 385-413.	This research links learner engagement with interactions when Hybrid Virtual Learning models are used. Various aspects have been considered, such as learners' prior experiences related to virtual worlds, their preconceptions regarding their use as a learning tool, and the impact that instructional designers' choices have on enhancing the opportunities for interactions. In this article, the impact that educational and leisure games have on university students' engagement is examined. The findings suggest that the use of game-like content can contribute positively to students' engagement, without, however, having a spectacular impact on the learning process.
20	Clayton, M. J., Hettche, M., & Kim, D. H. (2014). Moving participation beyond the classroom: Who benefits from online social communities?. *Journal of Advertising Education*, *18*(1), 5-13.	The proliferation of social media, especially among traditional higher education students, leads many advertising educators to Facebook and other social media platforms to engage their students. This study examines student participation in a traditional face-to-face classroom setting and compares it with a concurrent online social media community of the same students. It considers whether social media can enhance student engagement in subject matter discussions. Results indicate that students who were the most active in a traditional classroom setting were also the most active in the accompanying digital community. While personality traits like extraversion may influence participation in both settings similarly, the authors conclude that student interest in subject matter may also play a critical role.

21	Clements, J. C. (2015). Using Facebook to enhance independent student engagement: A case study of first-year undergraduates. *Higher Education Studies*, 5(4), 131-146.	A case study was conducted to assess the efficacy of online communication tools for enhancing independent student engagement in a first-year undergraduate class. Material relevant to course topics was shared with students through three communication platforms and data were extracted to measure student engagement. A questionnaire was also used to validate online data and determine why students chose a particular platform. Online results revealed that more than half of the students engaged with at least one post to some degree through one or more communication platforms. Facebook was the primary platform for student engagement. Students primarily engaged with material on Facebook by "liking" posts and used Facebook to share relevant material that they came across personally. There was no significant difference in student engagement with shared material between instructor-shared and student-shared posts, although Facebook engagement was 29% higher when the instructor commented and/or liked a post 1 day after sharing. Questionnaire results suggested that 90% of all students engaged with material to some extent. Most students engaged with between 3 and 10 posts by seeing a post, clicking the associated link, and reading the material. The majority of students engaged through Facebook and felt most comfortable with this platform. Of those engaging at the highest level, 66% used Facebook. Convenience appeared to be the dominant reason for engaged students choosing a particular platform. Weakly positive relationships between academic performance vs. overall engagement and engagement level were apparent. This study suggests that Facebook can be used to enhance independent student engagement.
22	Cochrane, T., Sissons, H., Mulrennan, D., & Pamatatau, R. (2013). Journalism 2.0: Exploring the impact of mobile and social media on journalism education. *International Journal of Mobile and Blended Learning (IJMBL)*, 5(2), 22-38.	This paper explores the impact of social media upon journalism education from two perspectives: both from the pedagogical changes Web 2.0 and mobile devices enable, and within the context of the changes in journalism that social media use are driving. A participatory action research approach was adopted, beginning with the establishment of a lecturer community of practice focusing upon exploring pedagogical change enabled by mobile social media while allowing the project to develop within a series of reflective interventions within the course. These interventions included the use of Twitter, blogging, QR Codes, and Facebook as part of authentic scenarios throughout the course. Drawing on this experience, the paper

		presents an emergent framework for a response to social media within journalism education, illustrating the positive impact of integrating the use of mobile social media on student engagement, collaboration and contextualising theory within authentic learning environments.
23	Collins, K., Groff, S., Mathena, C., & Kupczynski, L. (2019). Asynchronous video and the development of instructor social presence and student engagement. *Turkish Online Journal of Distance Education*, *20*(1), 53-70.	Enrollment in online learning continues to grow in the higher education sector, along with persistent goals dedicated to achieving better student outcomes and lowering attrition rates. Improved student engagement has been shown to possibly reduce attrition rates through a greater sense of connectedness and decreased feelings of isolation among online learners. Instructor social presence may be the most important factor in building the relationships that foster learning and retention. Through communication, the instructor conveys the necessary immediacy behaviors required to cultivate these interpersonal relationships. With improved technology that allows for enhanced communication in online classrooms, the use of asynchronous video may be an effective way to improve instructor social presence and student engagement. This quasi-experimental design aimed to determine whether asynchronous video or text-based communication increased students' perceptions of instructor social presence and student engagement in an online graduate classroom. Significance was found for student engagement based on the number of discussion posts and length of discussion posts. Students in the group who received text-based communication demonstrated increased student engagement in voluntary discussion boards as opposed to students in the group who received asynchronous video. There was no significant difference found for instructor social presence between the two groups.
24	Davis, K., Sridharan, H., Koepke, L., Singh, S., & Boiko, R. (2018). Learning and engagement in a gamified course: I nvestigating the effects of student characteristics. *Journal of Computer Assisted Learning*, *34*(5), 492-503.	The current study investigated college students' experiences of a gamified informatics course. We surveyed 139 students aged 18-31 years (M = 20 years, SD = 1.5) enrolled in an undergraduate informatics course focused on social networking technologies. Surveys were conducted at 3 time points during the course (beginning, middle, and end). Overall, we found positive trends with respect to students' perceptions of gamification's impact on their learning, achievement, and engagement in the course material. Although students who played and identified variously with recreational games were more alike than not, we did uncover one notable

		difference with respect to how students' gaming frequency impacted their engagement in the course. Nongamers expressed somewhat less motivation to do well in the course than frequent gamers. For all other measures of engagement, however, nongamers appeared to be equally engaged by the gamified format of the course as gamers. There were virtually no differences between male and female students' perceptions of gamification. This study contributes new insight into the conditions under which gamification succeeds or fails in educational settings. These insights will be useful to designers and instructors of gamified learning environments as they seek to engage and support a variety of learners.
25	del Barrio-García, S., Arquero, J. L., & Romero-Frías, E. (2015). Personal learning environments acceptance model: The role of need for cognition, e-learning satisfaction and students' perceptions. *Journal of Educational Technology & Society*, *18*(3), 129-141.	As long as students use Web 2.0 tools extensively for social purposes, there is an opportunity to improve students' engagement in Higher Education by using these tools for academic purposes under a Personal Learning Environment approach (PLE 2.0). The success of these attempts depends upon the reactions and acceptance of users towards e-learning using Web 2.0. This paper aims to analyse the factors (e-learning satisfaction and students' perceptions, among others) that determine the intention of use of a PLE 2.0 initiative. The study in addition analyses the moderating role of the Need for Cognition (NFC) in the model. The results indicate that the model proposed has a high explanatory power of the intention to use a PLE 2.0 and gives support to the moderating role of NFC. The study discusses how this analysis can help to improve course designs by teachers.
26	Delello, J. A., McWhorter, R. R., & Camp, K. M. (2015). Using social media as a tool for learning: A multi-disciplinary study. *International Journal on e-learning*, *14*(2), 163-180.	In order to explore the rich dynamics of using social media as a tool for learning within higher education classrooms, researchers across three disciplines: education, human resource development (HRD), and marketing, joined forces seeking ways to focus on learning through a retrospective analysis. Three concepts--engagement, community building, and personal meaning formed the framework for this study and were utilized to analyze the themes that emerged from student reflections and opinion surveys. This study used an exploratory mixed-method multiple-case study approach involving seven social media platforms: Pinterest, Facebook, Twitter, YouTube, LinkedIn, Second Life, and Skype. The research is unique because it not only looks at how social media can energize traditional and online instruction, it also cuts across three disciplines of higher education

		offering insights on how social media can be used to promote student learning.
27	DeNoyelles, A., & Reyes-Foster, B. (2015). Using word clouds in online discussions to support critical thinking and engagement. *Online Learning*, *19*(4), 1-12.	Being actively engaged in a task is often associated with critical thinking. Cultivating critical thinking skills, such as purposefully reflecting and analyzing one's own thinking, is a major goal of higher education. However, there is a challenge in providing college students opportunities to clearly demonstrate these skills in online courses. This research explores the effectiveness of incorporating word clouds--visual representations of word frequency in a given passage of text--into online discussions. We sought to establish whether implementing word clouds in online discussions would result in a higher incidence of critical thinking and engagement. Survey results from undergraduate participants (n = 132) revealed that students analyzing text in word clouds reported moderately higher scores on critical thinking and engagement than students analyzing the text in a linear fashion. A positive relationship was found between critical thinking and engagement, as well as peer interaction. This strategy can be applied to a wide range of educational environments to stimulate critical thinking and engagement.
28	Diug, B., Kendal, Y., & Ilic, D. (2016). Evaluating the use of twitter as a tool to increase engagement in medical education. *Education for Health*, *29*(3), 223-230.	Background: Social media is regularly used by undergraduate students. Twitter has a constant feed to the most current research, news and opinions of experts as well as organisations. Limited evidence exists that examines how to use social media platforms, such as Twitter, effectively in medical education. Furthermore, there is limited evidence to inform educators regarding social media's potential to increase student interaction and engagement. Aim: To evaluate whether social media, in particular Twitter, can be successfully used as a pedagogical tool in an assessment to increase student engagement with staff, peers and course content. Methods: First year biomedical science students at Monash University completing a core public health unit were recruited into the study. Twitter-related activities were incorporated into the semester long unit and aligned with both formative and summative assessments. Students completed a structured questionnaire detailing previous use of social media and attitudes towards its use in education post engagement in the Twitter-specific activities. Likert scale responses compared those who participated in the Twitter activities with those who did not using student's t-test. Results: A total of 236 (79.4%) of

		invited students participated in the study. Among 90% of students who reported previous use of social media, 87.2% reported using Facebook, while only 13.1% reported previous use of Twitter. Social media was accessed most commonly through a mobile device (49.1%). Students actively engaging in Twitter activities had significantly higher end-of-semester grades compared with those who did not [Mean Difference (MD) = 3.98, 95% CI 0.40, 7.55]. Students perceived that the use of Twitter enabled greater accessibility to staff, was a unique method of promoting public health, and facilitated collaboration with peers. Discussion: Use of social media as an additional, or alternate, teaching intervention is positively supported by students. Specific use of micro-blogs such as Twitter can promote greater student-staff engagement by developing an ongoing academic conversation.
29	Dixson Marcia, D., Greenwell Mackenzie, R., Rogers-Stacy, C., Weister, T., & Lauer, S. (2017). Nonverbal Immediacy Behaviors and Online Student Engagement: Bringing Past Instructional Research into the Present Virtual Classroom. Communication Education, 66(1), 37-53. doi:http://dx.doi.org/10.1080/03634523.2016.1209222	Nonverbal immediacy behaviors are underresearched in the online teaching environment. Using social presence theory as a guiding framework, this study explores several online nonverbal immediacy behaviors: emoticons/figurative language, color, cohesion, visual imagery, and audio in course design; response latency, length, time of day, and message frequency in forums; and type and promptness of feedback via grading and email. Coding of 51 online courses found that more consistent use of nonverbal immediacy behaviors was related to students' reports of higher course engagement. However, the nonverbal behaviors most associated with engagement were the ones not used as often. Findings indicate instructors can improve the effectiveness of online learning environments via nonverbal immediacy behaviors.
30	Dixson, M. D. (2015). Measuring student engagement in the online course: The Online Student Engagement scale (OSE). *Online Learning*, *19*(4), 1-15.	Student engagement is critical to student learning, especially in the online environment, where students can often feel isolated and disconnected. Therefore, teachers and researchers need to be able to measure student engagement. This study provides validation of the Online Student Engagement scale (OSE) by correlating student self-reports of engagement (via the OSE) with tracking data of student behaviors from an online course management system. It hypothesized that reported student engagement on the OSE would be significantly correlated with two types of student behaviors: observational learning behaviors (i.e., reading e-mails, reading

		discussion posts, viewing content lectures and documents) and application learning behaviors (posting to forums, writing e-mails, taking quizzes). The OSE was significantly and positively correlated with application learning behaviors. Results are discussed along with potential uses of the OSE by researchers and online instructors.
31	Dumford, A. D., & Miller, A. L. (2018). Online learning in higher education: exploring advantages and disadvantages for engagement. *Journal of Computing in Higher Education*, *30*(3), 452-465.	As the popularity of online education continues to rise, many colleges and universities are interested in how to best deliver course content for online learners. This study explores the ways in which taking courses through an online medium impacts student engagement, utilizing data from the National Survey of Student Engagement. Data was analyzed using a series of ordinary least squares regression models, also controlling for relevant student and institutional characteristics. The results indicated numerous significant relationships between taking online courses and student engagement for both first-year students and seniors. Those students taking greater numbers of online courses were more likely to engage in quantitative reasoning. However, they were less likely to engage in collaborative learning, student-faculty interactions, and discussions with diverse others, compared to their more traditional classroom counterparts. The students with greater numbers of online courses also reported less exposure to effective teaching practices and lower quality of interactions. The relationship between these engagement indicators and the percentage of classes taken online suggests that an online environment might benefit certain types of engagement, but may also be somewhat of a deterrent to others. Institutions should consider these findings when designing online course content, and encourage faculty to contemplate ways of encouraging student engagement across a variety of delivery types.
32	Dyson, B., Vickers, K., Turtle, J., Cowan, S., & Tassone, A. (2015). Evaluating the use of Facebook to increase student engagement and understanding in lecture-based classes. *Higher Education*, *69*(2), 303-313.	Both lecture delivery and Facebook use are ubiquitous aspects of higher education from staff and student points-of-view, respectively. An attempt was made to integrate the two by setting up a Facebook group and delivering contemporary news stories in preparation for in-lecture discussion in a large-scale (1,200 students across 5 sections) Introduction to Psychology class. Each section experienced two-thirds of the class with Facebook intervention and one-third without, thereby each section served as its own control group. Overall, Facebook intervention did not yield higher self-report of course

		engagement or understanding for those portions of the course. Only those individuals who never viewed the Facebook postings reported lower engagement and understanding of the in-lecture discussion, in addition to a lower appreciation of the link between the Facebook content and the lecture material. Our data suggest that successful integration of social media into the classroom is a challenging one and the relative success or failure of these interventions may stand or fall on the basis of a complex interaction between a number of factors including the timing of content delivery, the integration of social media content with course assessment and the students' own perspective on using social media for academic purposes.[PUBLICATION ABSTRACT]
33	Edmonds, R., & Smith, S. (2017). From playing to designing: Enhancing educational experiences with location-based mobile learning games. *Australasian Journal of Educational Technology*, *33*(6), 41-53.	This paper presents research into the benefits and implementation strategies of integrating location-based mobile learning games in higher education courses to enhance educational experiences. Two approaches were studied: learning by playing, and learning by designing. In the first, games were developed for undergraduate courses in four discipline areas, introduced during lectures, and played by students during a tutorial, as a self-guided activity or field excursion. In the second, students designed and developed their own prototype games as an educational activity to explore pedagogical strategies in personalised learning. Observations were made as students played and designed games. Online surveys, focus groups, and game analytics were used to help understand player behaviour and discover satisfaction rates, engagement, and the impact on learning outcomes. Results indicate that both the playing and self-designing of location-based mobile learning games can deliver active, engaging, and authentic educational experiences for students, enhancing opportunities to interact with locations, mobile content, and with each other. The impact of design, implementation strategy, and support on a student's motivation for, and engagement with, the learning is discussed, along with the designing of games to offer an opportunity for students to personalise their learning and develop new ICT skills.
34	Ellis, R. A., & Bliuc, A. M. (2019). Exploring new elements of the student approaches to learning framework: The role of online learning technologies	As online learning technologies are becoming an integral part of the learning experience at university, the quality of student learning is increasingly shaped by their experience of using these new artefacts. In many cases, the

	in student learning. *Active Learning in Higher Education*, *20*(1), 11-24.	research frameworks investigating the contribution of online learning technologies to quality outcomes are yet to have explicitly identified their role and contribution. Adopting a Student Approaches to Learning perspective, the study described in this article analyses how online learning technologies are qualitatively situated in relation to inquiry by investigating associations among approaches to online learning technologies, perceptions of the learning context, and academic achievement. The findings indicate that there are consistent and distinct patterns of associations between the different aspects of the learning experience that reveal the role of online learning technologies in the student experience of learning. The findings suggest that qualitative differences in how students use online learning technologies and differences in how they perceive online learning technologies are logically related to the quality of outcomes. The discussion highlights an appropriate role and location of online learning technologies in the Student Approaches to Learning framework in order to help researchers, students, teachers and university leaders better understand their contribution to qualitatively different experiences of learning. It suggests principles for a more effective design of learning tasks based on the results which indicated deeper engagement both online and in-class.
35	Evans, C. (2014). T witter for teaching: Can social media be used to enhance the process of learning?. *british Journal of educational technology*, *45*(5), 902-915.	Can social media be used to enhance the process of learning by students in higher education? Social media have become widely adopted by students in their personal lives. However, the application of social media to teaching and learning remains to be fully explored. In this study, the use of the social media tool Twitter for teaching was considered. Undergraduate students in Business and Management (n=252) were encouraged to use Twitter for communicating with their tutor and each other during a 12-week course. Their involvement was evaluated using a survey considering amount of Twitter usage and students' attitudes and experiences. The data were analysed using factor analyses, which revealed a single usage construct and three attitudinal factors. Three findings emerged. Firstly, a positive correlation was found between amount of Twitter usage and student engagement in university-associated activities including organising their social lives and sharing information. Secondly, course-related tweeting was not related to interpersonal relationships between students and their tutor.

		Thirdly, Twitter usage did not impact class attendance. The results are salient for educational practitioners wishing to introduce social media into their teaching. [PUBLICATION ABSTRACT]
36	Francescucci, A., & Foster, M. (2013). The VIRI (Virtual, Interactive, Real-Time, Instructor-Led) Classroom: The Impact of Blended Synchronous Online Courses on Student Performance, Engagement, and Satisfaction. *Canadian Journal of Higher Education*, *43*(3), 78-91.	Previous research on blended course offerings focuses on the addition of asynchronous online content to an existing course. While some explore synchronous communication, few control for differences between treatment groups. This study investigates the impact of teaching a blended course, using a virtual, interactive, real-time, instructor-led (VIRI) classroom, on student engagement, performance, and satisfaction. We use an experimental design with both a control group and a treatment group. Up to 90 students in a large urban university are randomly assigned by the registrar into two sections of an introductory marketing course. Using a pre- and post-semester questionnaire, the study measures student engagement, performance, and satisfaction. There are no statistical differences in student performance between the control and treatment groups. The only student engagement factor with a statistically significant difference between groups is student interest in their courses. Compared with the control group, the treatment group appears to be more interested (+10%) in their courses at the end of the semester. Finally, fewer than 2 in 10 students express dissatisfaction with their participation in a VIRI course. Blended course offerings are increasing in importance in marketing and business education. The study provides guidance for fine-tuning the features of those course offerings by demonstrating how a VIRI classroom leverages the capabilities of technology without compromising learning outcomes.
37	Francescucci, A., & Rohani, L. (2019). Exclusively synchronous online (VIRI) learning: The impact on student performance and engagement outcomes. *Journal of marketing Education*, *41*(1), 60-69.	There are growing trends in postsecondary education that emphasize the importance of online and technology-enabled learning. This study aims to investigate whether the use of virtual, interactive, real-time, instructor-led (VIRI) online learning can deliver the same student performance and engagement outcomes as a face-to-face (F2F) course. The data consist of 698 participants taught in eight sections, over two semesters, with two different instructors. An analysis of variance was used to compare the differences for both student performance and engagement outcomes. The findings show that a synchronous course delivered using VIRI classroom technology has the same level of student performance outcomes as F2F

		learning. This study suggests that VIRI technology is an effective synchronous learning environment.
38	Fredrickson, J. (2015). Online learning and student engagement: Assessing the impact of a collaborative writing requirement. *Academy of Educational Leadership Journal*, *19*(3), 127-140.	Considerable research has gone into answering the question of how college affects students (Astin, 1993b; Pascar ella & Terenzini, 2005). Student engagement has been linked to measures of student success including student learning and student satisfaction (Kuh et al., 2006) and, thus, is often examined by universities when seeking to improve student outcomes. Based on a growing body of evidence, colleges and universities are being encouraged to incorporate "high impact educational practices" (Kuh, 2008) which have been positively associated with student retention and student engagement. One such high-impact educational practice is the use of collaborative assignments and projects, and is the educational practice at the focus of this study. Concurrent with the growing focus on student outcomes has been considerable growth in online learning. Investigating the impact of the online environment on student engagement, a recent evaluation of National Survey of Student Engagement results suggests online learning presents some challenges (Chen, Kuh, & Gonyea, 2008). The aim of this paper is to examine the impact on student outcomes of a required collaborative writing project in the online class setting. By comparing measures of student engagement, learning and satisfaction between two sections of an online course, this study seeks to isolate the impact of the collaborative writing requirement on those outcomes. The findings indicate the collaborative requirement had a positive impact on engagement. The findings also reveal an unexpected negative association between the collaborative requirement and student satisfaction with faculty-student interaction. Based on these results, the author explores ways to promote the positive outcomes associated with collaborative online work while seeking to minimize possible negative consequences on student-faculty interaction.
39	Fukuzawa, S., & Boyd, C. (2016). Student engagement in a large classroom: Using technology to generate a hybridized problem-based learning experience in a large first year undergraduate class. *Canadian Journal for the Scholarship of Teaching and Learning*, *7*(1), 1-17.	Large first year undergraduate courses have unique challenges in the promotion of student engagement and self-directed learning due to resource constraints that prohibit small group discussions with instructors. The Monthly Virtual Mystery was developed to increase student engagement in a large ($N = 725$) first year undergraduate class in anthropology at the University of Toronto Mississauga. The teaching challenge was to develop a

		participation component (worth 6% of the final grade) that would increase student engagement without incurring any additional resource costs. The goal of the virtual mystery was to incorporate the principles of problem-based learning to engage students in self-directed learning through an online medium. Groups of approximately 50 students collaborated on a series of "virtual" case studies in a discussion board. Students submitted comments or questions each week to identify the information they needed to solve the mystery. A facilitator oversaw the discussion board to guide students in collaboration and resource acquisition. The final grades of students who participated in the virtual mystery (N = 297) were compared to students who participated in a passive online learning exercise that involved watching weekly online videos and answering questions in a course reader (N = 347). Student self-selection determined group participation. Participation completion for both the virtual mystery and the course reader were high (78.8% and 91.6% respectively). There were no significant differences in the distribution of final grades between the participation options. The high completion rate of the virtual mystery demonstrated that an active learning project can be implemented using problem-based learning principles through an online discussion board; however, the large online group collaborations were problematic. Students were frustrated with repetition and inequitable participation in such large groups; however, students evaluated the monthly mystery as a valuable learning tool that engaged them through the practical nature of the case scenarios.
40	Gibbings, P., Lidstone, J., & Bruce, C. (2015). Students' experience of problem-based learning in virtual space. *Higher Education Research & Development*, *34*(1), 74-88.	This paper reports outcomes of a study focused on discovering qualitatively different ways students experience problem-based learning in virtual space. A well-accepted and documented qualitative research method was adopted for this study. Five qualitatively different conceptions are described, each revealing characteristics of increasingly complex student experiences. Establishing characteristics of these more complex experiences assists teachers in facilitating students' engagement and encouraging deeper learning.
41	Gleason, B., & Greenhow, C. (2017). Hybrid education: The potential of teaching and learning with	Blended learning, which combines online and face-to-face pedagogy, is a fast-growing mode of instruction as universities strive for equitable and alternative pathways to course enrollment, retention, and educational

	robot-mediated communication. *Online Learning Journal*, *21*(4), 159-176.	attainment. However, challenges to successfully implementing blended instruction are that "social presence," or students' ability to project their personal characteristics into the learning space, is reduced with potential negative effects on student engagement, persistence, and academic achievement. Instructors are experimenting with robotmediated communication (RMC) to address these challenges. Results from a study of RMC at a large public university suggest that it offers advantages over traditionally used videoconferencing, including affordances for fostering students' embodiment in the classroom, their feelings of belonging and trust, and their ability to contribute ideas in authentic ways.
42	Glowatz, M., & Bofin, L. (2014). Enhancing Student Engagement Through Social Media A School of Business Case Study. *EAI Endorsed Transactions on e-Learning*, *1*(4).	While many universities have been deploying both electronic learning (eLearning) and social media applications for academic purposes, there is currently little research on the impact on their use on students' overall learning experiences and associated learning possibilities. This paper elaborates on several online academic activities, such as Facebook, Twitter and quizzes for one classroom taught school of business undergraduate (UG) module. The similarities and differences discovered across all aspects of this paper's research findings are examined against Chickering & Gamson's [1] seven principles of good practice teaching and Astin's [2] five tenets of engagement. Online activities were tracked over a period of one academic semester (fifteen weeks) and results insinuate that innovative and sustainable social media can indeed be utilised in higher education to enhance student learning and engagement.
43	Gnaur, D., & Hüttel, H. (2014). How A Flipped Learning Environment Affects Learning In A Course On Theoretical Computer Science. In E. Popescu, R. W. H. Lau, K. Pata, H. Leung, & M. Laanpere (Eds.), *Advances in Web-Based Learning - ICWL 2014 - Lecture Notes in Computer Science: 13th International Conference, Tallinn, Estonia, August 14-17, 2014. Proceedings* (Vol. 8613, pp. 219-228). Springer Publishing Company. Lecture Notes in Computer Science Vol. 8613 https://doi.org/10.1007/978-3-319-09635-3_25	This paper reports initial experiences with flipping the classroom in an undergraduate computer science course as part of an overall attempt to enhance the pedagogical support for student learning. Our findings indicate that, just as the flipped classroom implies, a shift of focus in the learning context influences the way students engage with the course and their learning strategies.

44	Grant, N. S., & Bolin, B. L. (2016). Digital Storytelling: A Method for Engaging Students and Increasing Cultural Competency. *Journal of Effective Teaching*, *16*(3), 44-61.	Digital storytelling is explored as a method of engaging students in the development of media literacy and cultural competency. This paper describes the perceptions and experiences of 96 undergraduate students at a large Midwestern university, after completing a digital storytelling project in a semester-long diversity course. Digital storytelling was introduced in the course as a pedagogy for engaging students with technology to develop cultural competency. Data were collected from an end of semester survey. Results found that the use of digital storytelling enhanced the learning environment through greater student engagement around technology and diversity issues. By bridging course content and pedagogy around diversity and cultural competency, students were able to gain competency, and experience the use of technology in academic/workplace settings, and create awareness/discourse around social issues.
45	Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, *11*(1), 1-20.	Studies have shown that course organization and structure, student engagement, learner interaction, and instructor presence have accounted for considerable variance in student satisfaction and perceived learning in online learning environments through a range of pathways, although no research to date has tested the mediational relationship identified. This study expanded upon the existing literature about online learning and the variables that influence student satisfaction and perceived learning. The researchers investigated the relationships among course structure/organization, learner interaction, student engagement, and instructor presence on student satisfaction and perceived learning. The results of this study were intended to inform practice related to increasing retention and improving the quality of online teaching and learning.
46	Gregory, P. L., Gregory, K. M., & Eddy, E. R. (2016). Factors Contributing to Student Engagement in an Instructional Facebook Group for Undergraduate Mathematics. *Journal of Computers in Mathematics and Science Teaching*, *35*(3), 249-268.	This study investigates factors contributing to student engagement in an educational Facebook group. The study is based on survey results of 138 undergraduate mathematics students at a highly diverse urban public university. Survey measures included engagement in the Facebook group, access to Facebook, comfort using technology, and interest in the class. Quantitative analysis found that interest in the class and access to technology both positively correlate to engagement in a Facebook group. The results suggest that integrating a familiar technology in a novel way requires instructor effort, knowledge, and technique. Study findings are

		discussed in terms of the TPACK framework (technological pedagogical content knowledge), developed by Mishra & Koehler (2006), emphasizing the importance of instructor preparation for effective instructional technology integration.
47	Gross, B., Marinari, M., Hoffman, M., DeSimone, K., & Burke, P. (2015). Flipped@ SBU: Student satisfaction and the college classroom. *Educational Research Quarterly*, *39*(2), 36-52.	In this paper, the authors find empirical support for the effectiveness of the flipped classroom model. Using a quasi-experimental method, the authors compared students enrolled in flipped courses to their counterparts in more traditional lecture-based ones. A survey instrument was constructed to study how these two different groups of students varied in terms of student engagement, student satisfaction, and academic performance. Overall, we found that high levels of student engagement and course satisfaction characterized the students in the flipped courses, without any observable reduction in academic performance.
48	Habel, C., & Stubbs, M. (2014). Mobile phone voting for participation and engagement in a large compulsory law course. *Research in Learning Technology, 22*. https://doi.org/10.3402/rlt.v22.19537	This article reports on an action-research project designed to investigate the effect of a technological intervention on the complex interactions between student engagement, participation, attendance and preparation in a large lecture delivered as part of a compulsory first-year law course, a discipline which has not been the focus of any previous study. The technology used was VotApedia, a form of mobile phone voting, and it was implemented in tandem with constructivist pedagogies such as explicit pre-reading and a prior context of interactive lecturing. Data were collected through observation, via mobile phone voting in class and by an online survey designed to specifically explore the relationship between attendance at VotApedia lectures and factors such as self-reported engagement, attendance and preparation. The findings indicated that student response systems (SRSs) are just as applicable to more Humanities-style disciplines which require divergent questioning, and supported complex interactions between engagement, attendance and preparation. Preliminary findings indicated that, although more work needs to be done, especially on the types of students who prefer to use these systems, there is a clear potential to increase student engagement in large law lectures through the use of SRSs.
49	Han, J. H., & Finkelstein, A. (2013). Understanding the effects of professors' pedagogical development with Clicker Assessment and Feedback technologies	Clicker Assessment and Feedback (CAF) is an instructional assessment and feedback strategy that is incorporated with interactive technologies, often referred to as clickers. Several thousand colleges and universities across

	and the impact on students' engagement and learning in higher education. *Computers & Education*, *65*, 64-76.	Europe and North America have adopted CAF as a strategy in their classrooms. This study has three major objectives. The first objective is to discuss the development of an instrument used to assess and investigate students' perceptions of CAF tools. The second is to examine the effects of university professors' CAF development on student perceptions of CAF. The third is to investigate the impact of professors' CAF methods on student learning and engagement. In this study the CAF project was initiated to enhance students' engagement in undergraduate courses by supporting CAF development to university professors at a large, publically-funded University. Professors (n = 74) and students (n = 5459) volunteered to participate over this four-semester long project. Principal Component Analysis (PCA) was performed to explore students' perceptions of CAF efficacy. Multivariate Analysis of Variance (MANOVA) was used to explore the relationship between professors' CAF development, their use of CAF in formative or summative assessment and students' perceptions of CAF. The results demonstrate that 1) students perceive the use of CAF tools as having an impact on their engagement and learning, 2) increased CAF development by professors impact on students' perceptions of CAF, and 3) professors' use of CAF for formative assessment is more influential than summative assessment on students' perceptions of engagement and learning. This study suggests that CAF is most effective for student engagement and learning if it is supported by appropriate CAF development of professors and their subsequent formative use of CAF during teaching. (Contains 7 tables and 1 figure.)
50	Hatzipanagos, S., & Code, J. (2016). Open badges in online learning environments: Peer feedback and formative assessment as an engagement intervention for promoting agency. *Journal of Educational Multimedia and Hypermedia*, *25*(2), 127-142.	Student engagement is both a ubiquitous and broadly defined term in education. Engagement is the "conceptual glue" that connects student agency, social influences, organizational structures, and school culture. Of particular interest to the work presented in this paper, is how engagement and agency are interrelated, and the role of this relationship in online learning--particularly in formative assessment and peer feedback. This paper reports the use of digital badges to support student learning and promote engagement in higher education. The purpose of the Open Badges project was to explore whether open badges can support learning in online environments through peer feedback. Findings indicate that participants

		demonstrated engagement attributes that encompass affective, behavioural and cognitive indicators however, our projections about the motivation for achieving the badges were opposite of what was expected.
51	Henderson, M., Selwyn, N., Finger, G., & Aston, R. (2015). Students' everyday engagement with digital technology in university: exploring patterns of use and 'usefulness'. *Journal of Higher Education Policy and Management*, 7(3), 308-319.	The much-discussed potential of 'technology-enhanced learning' is not always apparent in the day-to-day use of digital technology throughout higher education. Against this background, the present paper considers the digital devices and resources that students engage most frequently with during their university studies, what these technologies are being used for, and perceptions of 'usefulness' attached to these uses. The paper draws upon data gathered from a survey of undergraduate students (n = 1658) from two Australian universities. Having explored a variety of factors shaping student engagement with digital technology within these university settings, the paper considers how ongoing discussions about digital technology and higher education might better balance enthusiasms for the 'state of the art' (i.e. what we know might be achieved through technology-enabled learning) with an acknowledgement of the 'state of the actual' (i.e. the realities of technology use within contemporary university contexts).
52	Henrie, C. R., Bodily, R., Manwaring, K. C., & Graham, C. R. (2015). Exploring intensive longitudinal measures of student engagement in blended learning. *International Review of Research in Open and Distributed Learning*, 16(3), 131-155.	In this exploratory study we used an intensive longitudinal approach to measure student engagement in a blended educational technology course, collecting both self-report and observational data. The self-report measure included a simple survey of Likert-scale and open-ended questions given repeatedly during the semester. Observational data were student activity data extracted from the learning management system. We explored how engagement varied over time, both at the course level and between students, to identify patterns and influences of student engagement in a blended course. We found that clarity of instruction and relevance of activities influenced student satisfaction more than the medium of instruction. Student engagement patterns observed in the log data revealed that exploring learning tools and previewing upcoming assignments and learning activities can be useful indicators of a successful learning experience. Future work will investigate these findings on a larger scale.
53	Holmes, N. (2015). Student perceptions of their learning and engagement in response to the use of a continuous e-assessment in an undergraduate	Student engagement is an important issue in higher education, and is related to the quality of the student experience. Increasing student engagement is one way of enhancing quality at a higher education institution. An institution

	module. *Assessment & Evaluation in Higher Education*, *40*(1), 1-14.	is able to influence student engagement in a number of ways, one being through curriculum design. The use of a low-stakes continuous weekly summative e-assessment had a positive influence on student engagement in an optional level 5 (second year) undergraduate geography module. Students considered their increased engagement was a direct consequence of this assessment method. It was also found that students thought they improved their learning, particularly their understanding, as a result of the continuous assessment. This study suggests that carefully designed assessments can be used to increase student engagement and learning, and, as a result, contribute to improving the quality of the overall student experience.
54	Holmes, N. (2018). Engaging with assessment: Increasing student engagement through continuous assessment. *Active Learning in Higher Education*, *19*(1), 23-34.	Student engagement is intrinsically linked to two important metrics in learning: student satisfaction and the quality of the student experience. One of the ways that engagement can be influenced is through careful curriculum design. Using the knowledge that many students are "assessment-driven," a low-stakes continuous weekly summative e-assessment was introduced to a module. The impact this had on student engagement was measured by studying student activity within the module virtual learning environment. It was found that introduction of the e-assessments led to a significant increase in virtual learning environment activity compared to the virtual learning environment activity in that module the previous year, and also compared to the virtual learning environment activity of two other modules studied by the same student cohort. As many institutions move towards greater blended or online deliveries, it will become more important to ensure that virtual learning environments encourage high levels of student engagement in order to maintain or enhance the student experience.
55	Irby, S. M., Borda, E. J., & Haupt, J. (2018). Effects of implementing a hybrid wet lab and online module lab curriculum into a general chemistry course: Impacts on student performance and engagement with the chemistry triplet. *Journal of Chemical Education*, *95*(2), 224-232.	Here, we describe the implementation a hybrid general chemistry teaching laboratory curriculum that replaces a portion of a course's traditional "wet lab" experiences with online virtual lab modules. These modules intentionally utilize representations on all three levels of the chemistry triplet-macroscopic, submicroscopic, and symbolic. The implementation of this curriculum allowed an opportunity to evaluate this new course structure. First, student performance was assessed based on pre- and post-assessments. Second, dialogue from students working through the traditional and module versions of one lab was analyzed for how each format encouraged students

		to engage with the chemistry triplet. Data suggest both formats led to positive learning gains, but the differences between formats were not statistically significant. However, there was a significant difference in student engagement with the chemistry triplet, with module students showing a higher overall amount of triplet-related dialogue and more continuous dialogue segments connecting multiple levels of the triplet.
56	Johnson, B. A. (2014). Transformation of online teaching practices through implementation of appreciative inquiry. *Online Learning*, *18*(3), 1-22.	The purpose of this case study was to explore the application and outcome of appreciative inquiry as an online instructional strategy for the development of three specific factors: adult learner motivation, engagement, and performance. Appreciative andragogy was an original phrase developed for this study and is an adaptation of appreciative inquiry. Appreciative inquiry has been successfully utilized within organizations to facilitate change and development, while enhancing employee motivation, engagement, and performance. Because there is little research concerning the application of appreciative inquiry to an academic environment, elements of appreciative inquiry were implemented as an instructional strategy within undergraduate and graduate online classrooms. The appreciative inquiry model was adapted for this study as appreciative andragogy and utilized over a four-week implementation period. The participants worked with selected students from their online class and they measured the three factors (motivation, engagement, and performance) before and after the implementation phase. The findings of this study indicate that appreciative andragogy can be applied as an instructional strategy in any online classroom regardless of the subject matter and it holds the potential to have a positive impact on the online learning classroom environment. The study concluded that appreciative andragogy has an ability to take the distance out of distance learning.
57	Jozwiak, J. (2015). Helping students to succeed in general education political science courses? Online assignments and in-class activities. *International Journal of Teaching and Learning in Higher Education*, *27*(3), 393-406.	The inclusion of supplemental online assignments and in-class active learning activities can lead to greater levels of student engagement and learning. Students reported that they were more engaged in the classroom and felt that both helped them in exam preparation. Both were also shown to have positively affected student performance and, perhaps most hearteningly, seemed to have had the greatest impact on lower achieving students.

58	Kahn, P., Everington, L., Kelm, K., Reid, I., & Watkins, F. (2017). Understanding student engagement in online learning environments: The role of reflexivity. *Educational Technology Research and Development*, *65*(1), 203-218.	It is important to develop understanding of what underpins the engagement of students in online learning environments. This article reports on a multiple case study that explored student engagement in a set of postgraduate degrees offered on a fully online basis. The study was based on a theorization of student engagement as the exercise of intentional human action, or agency. It identified ways in which tasks and social relations in the online learning environments triggered reflexivity on the part of students, with "reflexivity" understood to mean the ordinary mental capacity to consider oneself in relation to one's social setting. A different relationship between reflexivity and student engagement was in view than that identified by Margaret Archer with regard to reflexivity and social mobility. Rather than displaying one dominant mode of reflexivity, the students considered in the study were seen to draw on a range of modes. The engagement of these students in their learning was also seen to depend on the manner in which they engaged in reflexivity centred on the pursuit of shared goals, that is in collective reflexivity. Specific practices were seen to trigger constructive forms of collective reflexivity, while fractured and restricted forms of collective reflexivity were linked to student disengagement in relation to joint tasks. As well as adverting to the importance of collective reflexivity to learning, the study highlights scope for dissonance between the modes of reflexivity and practices favoured by an online learning environment and the reflexive profile of the student.
59	Kahu, E., Stephens, C., Leach, L., & Zepke, N. (2015). Linking academic emotions and student engagement: Mature-aged distance students' transition to university. *Journal of Further and Higher Education*, *39*(4), 481-497.	Research into both student engagement and student emotions is increasing, with widespread agreement that both are critical determinants of student success in higher education. Less researched are the complex, reciprocal relationships between these important influences. Two theoretical frameworks inform this paper: Pekrun's taxonomy of academic emotions and Kahu's conceptual framework of student engagement. The prospective qualitative design aims to allow a rich understanding of the fluctuating and diverse emotions that students experience during the transition to university and to explore the relationships between academic emotions and student engagement. The study follows 19 mature-aged (aged 24 and over) distance students throughout their first semester at university, using video diaries to collect data on their emotional experiences and their engagement with their

		study. Pre and post-semester interviews were also conducted. Findings highlight that different emotions have different links to engagement: as important elements in emotional engagement, as inhibitors of engagement and as outcomes that reciprocally influence engagement. There are two key conclusions. First, student emotions are the point of intersection between the university factors such as course design and student variables such as motivation and background. Second, the flow of influence between emotions, engagement, and learning is reciprocal and complex and can spiral upwards towards ideal engagement or downwards towards disengagement and withdrawal.
60	Karaksha, A., Grant, G., Anoopkumar-Dukie, S., Nirthanan, S. N., & Davey, A. K. (2013). Student engagement in pharmacology courses using online learning tools. *American journal of pharmaceutical education*, *77*(6), 1-10.	To assess factors influencing student engagement with e-tools used as a learning supplement to the standard curriculum in pharmacology courses. A suite of 148 e-tools (interactive online teaching materials encompassing the basic mechanisms of action for different drug classes) were designed and implemented across 2 semesters for third-year pharmacy students. Student engagement and use of this new teaching strategy were assessed using a survey instrument and usage statistics for the material. Use of e-tools during semester 1 was low, a finding attributable to a majority (75%) of students either being unaware of or forgetting about the embedded e-tools and a few (20%) lacking interest in accessing additional learning materials. In contrast to semester 1, e-tool use significantly increased in semester 2 with the use of frequent reminders and announcements (p<0.001). The provision of online teaching and learning resources were only effective in increasing student engagement after the implementation of a "marketing strategy" that included e-mail reminders and motivation.
61	Kent, M. (2013). Changing the conversation: Facebook as a venue for online class discussion in higher education. *MERLOT Journal of Online Learning and Teaching*, *9*(4), 546-565.	In this paper, the author reports on a study of the online activity of students in a final-year unit in the Internet Communications course at Curtin University. Student activity was recorded in the discussion forums of the Blackboard learning management system for three instances of the same unit, in 2011 and 2012. Then, in the latter two of these instances, an additional discussion forum was added, on Facebook, and activity was also recorded. Students' posts were measured for content, length, and which week of the study period they were postedonline. The study found the addition of the Facebook forum resulted in a significantly higher level of student

		activity, in real terms and across the 13 weeks of the unit. The addition of the Facebook forum did not significantly affect the level of student participation in the Blackboard forum. The use of the Facebook forum also changed the type of interactions by students, with the learners being more involved in discussions about course administration andassignments. Most notably, both students and staff began posting additional links to material that supported learning in the unit, but were not set as part of the unit's formal readings.
62	Kim, H. J., Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-18.	University students, who are assumed to be digital natives, are exposed to campus e-learning environments to improve their academic performance at the beginning of their academic careers. However, previous studies of students' perceptions of e-learning demonstrate a lack of consistent results with respect to the prediction of their academic achievement. The goal of this study was to examine university students' perceptions of e-learning, based on their experiences, and the mediating roles of academic engagement and digital readiness within the university context of an e-learning environment for academic achievement. A total of 614 undergraduate students enrolled in a Korean university participated in this study. Using a partial least squares model to develop the theory, we examined students engaging in university e-learning environments in relation to their perceptions of e-learning, digital readiness, academic engagement, and academic achievement (i.e., grade point average). The results are significant for the importance of students' academic engagement and digital readiness as mediators in their perceptions of e-learning predicted by academic achievement. Although students positively perceived e-learning experiences on campus, they must have strong digital skills to perform academic work and commit to effortful involvement in the context of academic learning in university e-learning environments. Our results provide practical implications for ways to enhance effective adoption of e-learning environments by college students, educators, and administrators.
63	Lawrence, J., Brown, A., Redmond, P., & Basson, M. (2019). Engaging the disengaged: Exploring the use of course-specific learning analytics and nudging to	Universities increasingly implement online delivery to strengthen students' access and flexibility. However, they often do so with limited understanding of the impact of online pedagogy on student engagement. To explore these issues, a research project was conducted investigating the use of course-

	enhance online student engagement. *Student Success*, *10*(2), 47-59.	specific learning analytics to 'nudge' students into engaging more actively in their courses. Drawing on perspectives emanating from communication and critical theories, the research involved a staged intervention strategy conducted across three courses (n=892) focussing on a range of timely, strategic communication interventions. Research findings revealed benefits for students who felt supported by explicit expectation management and the strategic use of early nudging to enhance their prioritisation of key course-specific resources. Academics benefited by making use of nudging templates/principles to increase student engagement in their courses. The course-specific context meant that academics and students explicitly shared ways of working in the one place where learners ultimately succeed – the course.
64	Lin, S. Y., Aiken, J. M., Seaton, D. T., Douglas, S. S., Greco, E. F., Thoms, B. D., & Schatz, M. F. (2017). Exploring physics students' engagement with online instructional videos in an introductory mechanics course. *Physical Review Physics Education Research*, *13*(2), 020138.	The advent of new educational technologies has stimulated interest in using online videos to deliver content in university courses. We examined student engagement with 78 online videos that we created and were incorporated into a one-semester flipped introductory mechanics course at the Georgia Institute of Technology. We found that students were more engaged with videos that supported laboratory activities than with videos that presented lecture content. In particular, the percentage of students accessing laboratory videos was consistently greater than 80% throughout the semester. On the other hand, the percentage of students accessing lecture videos dropped to less than 40% by the end of the term. Moreover, the fraction of students accessing the entirety of a video decreases when videos become longer in length, and this trend is more prominent for the lecture videos than the laboratory videos. The results suggest that students may access videos based on perceived value: students appear to consider the laboratory videos as essential for successfully completing the laboratories while they appear to consider the lecture videos as something more akin to supplemental material. In this study, we also found that there was little correlation between student engagement with the videos and their incoming background. There was also little correlation found between student engagement with the videos and their performance in the course. An examination of the in-video content suggests that students engaged more with concrete information that is explicitly required for assignment

		completion (e.g., actions required to complete laboratory work, or formulas or mathematical expressions needed to solve particular problems) and less with content that is considered more conceptual in nature. It was also found that students' in-video accesses usually increased toward the embedded interaction points. However, students did not necessarily access the follow-up discussion of these interaction points. The results of the study suggest ways in which instructors may revise courses to better support student learning. For example, external intervention that helps students see the value of accessing videos may be required in order for this resource to be put to more effective use. In addition, students may benefit more from a clicker question that reiterates important concepts within the question itself, rather than a clicker question that leaves some important concepts to be addressed only in the discussion afterwards.
65	Luna-Nevarez, C., & McGovern, E. (2018). On the use of mobile apps in education: The impact of digital magazines on student learning. *Journal of Educational Technology Systems*, *47*(1), 17-31.	As the use of technology evolves in education, an extensive range of new smart devices and digital applications is becoming available to academics. Digital magazines are an example of such technologies, which can help educators to improve the learning experience of their students inside and outside of the classroom. Digital magazines are widely available and some can be further customized and curated by instructors using mobile apps. This article explores the impact of curated digital magazines, created and distributed via a mobile app--Flipboard, in enhancing students' engagement, enjoyment, and learning of class-related content. Overall, students responded favorably to the adoption of this technological innovation. Students exposed to the digital magazines and mobile app displayed higher levels of enjoyment with class content and performed better on a knowledge assessment, relative to students in a control condition. The article concludes with a discussion of results and implications for future research.
66	Mango, O. (2015). iPad use and student engagement in the classroom. *Turkish Online Journal of Educational Technology-TOJET*, *14*(1), 53-57.	iPads and handheld digital devices have been securing their place in educational institutions surrounded by debates between advocates and skeptics. In light of not enough evidence supporting the use of iPads in education, this study examined the ways that college students in two foreign language classrooms perceived the influence of the use of iPads on their learning and engagement with classroom activities. The participants, students enrolled in two foreign language classrooms at a college in the

		Southwest of the US, responded to a 5-point Likert type questionnaire. The data analysis and results showed that students believed that the iPads played a significant role in their learning engagement thus promoting active learning in the classroom and paving way for student success.
67	Marques, M. A., Viegas, M. C., Costa-Lobo, M. C., Fidalgo, A. V., Alves, G. R., Rocha, J. S., & Gustavsson, I. (2013). How remote labs impact on course outcomes: Various practices using VISIR. *IEEE Transactions on Education*, *57*(3), 151-159.	As technology is increasingly being seen as a facilitator to learning, open remote laboratories are increasingly available and in widespread use around the world. They provide some advantages over traditional hands-on labs or simulations. This paper presents the results of integrating the open remote laboratory VISIR into several courses, in various contexts and using various methodologies. These integrations, all related to higher education engineering, were designed by teachers with different perspectives to achieve a range of learning outcomes. The degree to which these VISIR-related outcomes were accomplished is discussed. The results reflect the levels of student engagement and learning and of teacher involvement. From the analysis, a connection between these two aspects was traced, although only related to the user profiles. VISIR is shown to be always of benefit for more motivated students, but this benefit can be maximized under particular conditions and characteristics.
68	Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, *22*(1), 205-222.	Student engagement increases student satisfaction, enhances student motivation to learn, reduces the sense of isolation, and improves student performance in online courses. This survey-based research study examines student perception on various engagement strategies used in online courses based on Moore's interaction framework. One hundred and fifty-five students completed a 38-item survey on learner-to-learner, learner-to-instructor, and learner-to-content engagement strategies. Learner-to-instructor engagement strategies seemed to be most valued among the three categories. Icebreaker/introduction discussions and working collaboratively using online communication tools were rated the most beneficial engagement strategies in the learner-to-learner category, whereas sending regular announcements or email reminders and providing grading rubrics for all assignments were rated most beneficial in learner-to-instructor category. In the learner-content category, students mentioned working on real-world projects and having discussions with structured or guiding questions were the most beneficial. This study also analyzed the effect of age, gender, and

		years of online learning experience differences on students' perception of engagement strategies. The results of the study have implications for online instructors, instructional designers, and administrators who wish to enhance engagement in the online courses.
69	Matthew, A. F., & Butler, D. (2017). Narrative, machinima and cognitive realism: Constructing an authentic real-world learning experience for law students. *Australasian Journal of Educational Technology*, *33*(1), 148-162.	In Australian law schools didactic pedagogies such as lectures devoted to the transmission of theory and knowledge to a largely passive audience still predominate. However, curriculum design embedding authentic learning pedagogies has been shown to be supportive of student learning. The challenge in adopting such curriculum design is how to offer situated cognitive learning opportunities on a large scale to increasingly diverse cohorts. This paper is a case study of a blended learning approach introduced into a second year undergraduate law unit to teach negotiation theory and practice to a large cohort of students studying in full-time, part-time, and distance external modes. This innovation was situated in an authentic simulated learning environment created through careful design of a high-fidelity scenario, utilising a narrative depicted by "Second Life" machinima video and simulated documentation. This approach resulted in greater student engagement and improved learning outcomes.
70	Mayfield, C. H., Ohara, P. T., & O'Sullivan, P. S. (2013). Perceptions of a mobile technology on learning strategies in the anatomy laboratory. *Anatomical sciences education*, *6*(2), 81-89.	Mobile technologies offer new opportunities to improve dissection learning. This study examined the effect of using an iPad-based multimedia dissection manual during anatomy laboratory instruction on learner's perception of anatomy dissection activities and use of time. Three experimental dissection tables used iPads and three tables served as a control for two identical sessions. Trained, non-medical school anatomy faculty observers recorded use of resources at two-minute intervals for 20 observations per table. Students completed pre- and post-perception questionnaires. We used descriptive and inferential analyses. Twenty-one control and 22 experimental students participated. Compared with controls, experimental students reported significantly ("P" less than 0.05) less reliance on paper and instructor resources, greater ability to achieve anatomy laboratory objectives, and clarity of the role of dissection in learning anatomy. Experimental students indicated that the iPad helped them in dissection. We observed experimental students more on task (93% vs. 83% of the time) and less likely to be seeking an instructor (2% vs. 32%). The groups received

		similar attention from instructors (33% vs. 37%). Fifty-nine percent of the time at least one student was looking at the iPad. Groups clustered around the iPad a third of their time. We conclude that the iPad-manual aided learner engagement, achieved instructional objectives, and enhanced the effectiveness and efficiency of dissection education. (Contains 2 tables and 3 figures.)
71	McCallum, S., Schultz, J., Sellke, K., & Spartz, J. (2015). An examination of the flipped classroom approach on college student academic involvement. *International Journal of Teaching and Learning in Higher Education*, *27*(1), 42-55.	Colleges and universities remain attentive to developing and supporting ways to foster student academic success. These efforts have taken on more importance as student success, commonly measured by student learning achievement, has failed to meet expectations. For colleges and universities, the flipped classroom represents a student-centered method of fostering academic involvement that is recognized as a positive contributor to student success. This exploratory study examined the flipped classroom's influence on student academic, student peer-to-peer and student-faculty involvement. The study involved 60 undergraduate students (28 male, 32 female) from three flipped classrooms consisting of courses in mathematics and business. Focus group interviews were conducted to gather student feedback regarding their behaviors and classroom engagement. Additionally, a brief survey was administered to collect demographic information as well as quantitative data regarding student perceptions. Findings indicated student academic involvement was present through note taking, viewing video lectures, active in-class learning and collaboration. Students cited peer-to-peer and student-faculty engagement as essential to relationship building, peer learning, and meaningful involvement with faculty.
72	McGuinness, C., & Fulton, C. (2019). Digital literacy in higher education: A case study of student engagement with e-tutorials using blended learning. *Journal of Information Technology Education: Innovations in Practice*, *18*, 1-28.	Aim/Purpose: This paper reports on a case study project which had three goals; to develop a suite of original interactive digital skills e-tutorials to be embedded in undergraduate and postgraduate courses; to evaluate the students' experience and engagement with the e-tutorials over one semester; and to explore their general attitudes towards online and blended learning. Background: Online and blended learning modes continue to grow in popularity in higher education, with the aim of streamlining and enhancing student learning, supporting collaboration and creativity, and equipping students with the skills they will require to work and live in an increasingly digitized world. This practice-based case study highlights factors which

		positively and negatively affect user engagement with digital learning objects and explores students' perceptions of the role of online learning within their academic programs. Methodology: A suite of nine interactive e-tutorials, addressing essential digital literacy skills for university students, was developed through instructor and student peer collaboration using Articulate software, informed by best practice. The e-tutorials were embedded in the institutional Learning Management System for three undergraduate and postgraduate courses, in which digital literacy formed the core learning content, to complement classroom-based learning. Students in these courses were surveyed via SurveyMonkey about their specific experience of using the e-tutorials, as well as their general perceptions of digital literacy and online learning. Eighty-six students in total completed the questionnaire, which consisted of twenty-three closed and open-ended questions. Contribution: Through highlighting both the positive and the challenging aspects of the students' reported experience of online learning, this case study contributes useful insights to the body of literature on user engagement with digital learning objects in higher education, as well as students' perceptions and experience of blended learning. Findings: The e-tutorials were perceived as valuable in reinforcing classroom learning, allowing respondents to revise concepts and materials covered in faceto-face classes, at their own pace and in their own time. Survey responses showed that the accessibility, ease-of-use, design and duration of the etutorials were deemed effective in terms of user engagement; however, several technological challenges were identified, such as browser incompatibility, uneven sound quality and general Internet connection issues, which disrupted their learning. Overall, students expressed enjoyment of the learning facilitated by the e-tutorials; however, rather than favoring online learning alone, they expressed a preference for a blended learning environment, with a combination of complementary learning approaches; survey respondents did not generally wish to forego face-to-face classes entirely. Recommendations for Practitioners: Instructors should seek to strategically embed interactive digital learning objects in their courses at defined points of need in a logical structure, e.g., to reinforce classroom-based learning, or to support specific skill development. Potential disruption

		to learning should be minimized by following best practice guidelines to ensure ease of access, a seamless user experience, and timely feedback, as well as providing adequate support for rapid resolution of technical glitches. Recommendations for Researchers: E-tutorials offer a useful means of exploring ways in which students acquire learning in the digital environment. A wider, collaborative exploration is needed to provide comparative studies which move beyond case studies. Impact on Society: Online learning mechanisms, such as e-tutorials, offer students different means of acquiring essential literacy skills and different ways to interact with content. E-tutorials constitute reusable learning objects, which can be accessed as just-in-time delivery modes, when students perceive they need to review particular skills or reinforce learning aterial. Future Research: This research is now expanding into different types of reusable learning objects. E-tutorials may be developed in multiple ways, and comparative research around e-tutorial models will deepen our understanding of how students interact with content in formal learning contexts. As the digital educational landscape continues to expand alongside traditional face-to-face and analogue learning modes, a key research focus will be student and instructor perceptions and experience of blended learning in different contexts.
73	McKenzie, W. A., Perini, E., Rohlf, V., Toukhsati, S., Conduit, R., & Sanson, G. (2013). A blended learning lecture delivery model for large and diverse undergraduate cohorts. *Computers & Education*, *64*, 116-126.	A blended learning model was developed to enhance lecture delivery in a large, diverse introductory psychology unit, introducing the use of an online, personalized learning system for lecture preparation and using lecture time to extend students' understanding. Changes to the assessment included diagnostic, formative and summative online quizzes. Using hierarchical multiple regression to account for the variance associated with prior achievement and background knowledge, the results show that students who completed the online formative assessments had significantly higher scores on summative assessment tasks, and that scores were even higher for students who used these resources repeatedly. Changes to future implementations of the model are suggested to improve student engagement in formative assessment, and to facilitate lecturer's use of reports on student progress to focus and improve the quality of discussion in the face-to-face lectures. (Contains 6 tables and 3 figures.)

74	Megele, C. (2015). eABLE: embedding social media in academic curriculum as a learning and assessment strategy to enhance students learning and e-professionalism. *Innovations in Education and Teaching International*, *52*(4), 414-425.	This paper outlines the redesign of an MSc module to enhance students' engagement and learning through embedding social media technologies into the academic curriculum as a learning and assessment strategy, and in a complementary manner that facilitated and enhanced the achievement of the module's learning outcomes. This paper describes the process and some of the components of the module redesign. Although the eventual redesign allowed for incorporation of social media both as a learning strategy and for assessment purposes, this paper is focused on use/application of social media in academic curriculum as a learning strategy. Grounding the new module in constructivist pedagogy, and an enquiry-based action learning model, the redesign leveraged the use of social media to expand the interrelational dimensions of students' learning. This increased the students' engagement and the depth and breadth of their learning, while enhancing their appreciation for e-professionalism and personal learning networks.
75	Mello, L. V. (2016). Fostering postgraduate student engagement: online resources supporting self-directed learning in a diverse cohort. *Research in Learning Technology*, *24*, 1-16.	The research question for this study was: "Can the provision of online resources help to engage and motivate students to become self-directed learners?" This study presents the results of an action research project to answer this question for a postgraduate module at a research-intensive university in the United Kingdom. The analysis of results from the study was conducted dividing the students according to their programme degree-- Masters or PhD--and according to their language skills. The study indicated that the online resources embedded in the module were consistently used, and that the measures put in place to support self-directed learning (SDL) were both perceived and valued by the students, irrespective of their programme or native language. Nevertheless, a difference was observed in how students viewed SDL: doctoral students seemed to prefer the approach and were more receptive to it than students pursuing their Masters degree. Some students reported that the SDL activity helped them to achieve more independence than did traditional approaches to teaching. Students who engaged with the online resources were rewarded with higher marks and claimed that they were all the more motivated within the module. Despite the different learning experiences of the diverse cohort, the study found that the blended nature of the course and its resources in support of SDL created a learning environment which positively affected student learning.

76	Mihret, D. G., Abayadeera, N., Watty, K., & McKay, J. (2017). Teaching auditing using cases in an online learning environment: The role of ePortfolio assessment. *Accounting Education*, *26*(4), 335-357.	While teaching auditing using cases is regarded as an effective approach, spatial separation of students and teachers in online contexts can restrict the application of case teaching. This study examines an undergraduate auditing course implemented to address this challenge by integrating case teaching with ePortfolio assessment. Students' written ePortfolio submissions and scores were analysed. Results show that despite spatial separation of the online learner from peers and teachers, integrating case teaching with ePortfolio assessment elicits learner behaviour desirable in online auditing courses. This approach enables online learners' self-directed engagement as compared to instructor-led case teaching in conventional teaching contexts. Based on a new pedagogical approach for teaching auditing trialled in reduced (or absence of) face-to-face interaction, this study informs course design in auditing. It demonstrates that active student engagement, which presupposes an instructor's role to facilitate student involvement in case discussions, can be implemented in online teaching of auditing.
77	Mooney, M., Southard, S., & Burton, C. H. (2014). Shifting from obligatory discourse to rich dialogue: Promoting student interaction in asynchronous threaded discussion postings. *Online Journal of Distance Learning Administration*, *17*(1), 1-12.	Asynchronous online threaded discussions are widely recognized as a tool to enhance learning in the virtual classroom. While they can serve as a mechanism for reinforcing material and promoting a deeper understanding of course content, discussion boards often lack rich and dynamic dialogue, and instead serve as a field of obligatory discourse, hasty postings, and repetitive content. This study examines measures to promote meaningful interaction in threaded online discussion postings. The researchers created an innovative, activity-based discussion exercise, known as the "suspense model," that was utilized in two undergraduate hybrid online courses to promote student-centered learning and to increase the quality and quantity of student engagement. The researchers conducted a second discussion board activity in the same classes whereby students were provided with the problem and supporting material at the outset of the exercise. Qualitative methods were employed to measure the quality of student performance on the exercises to compare levels of interactivity. Results indicate that students more promptly and thoroughly engaged in the discussion board utilizing the suspense model, and students' perception of the exercise was tentatively favorable as compared to its conventional counterpart.

78	Muir, T., Milthorpe, N., Stone, C., Dyment, J., Freeman, E., & Hopwood, B. (2019). Chronicling engagement: students' experience of online learning over time. *Distance Education*, *40*(2), 262-277.	Although there is ample research into student engagement in online learning, much of this investigates the student experience through surveys administered at a fixed point in time, usually at the exit point of a single unit of study or course. The study described in this paper, by contrast, aimed to understand online student engagement over a whole semester, guided by two overarching questions: What factors impact students' engagement over a semester? What factors account for fluctuation in engagement levels over time? This paper presents results from weekly feedback on online education students' engagement over the length of one semester at a regional Australian university. It also chronicles in more depth the experiences of one student across the same semester. The findings offer longitudinal accounts of student engagement, demonstrating that levels of engagement fluctuate and are influenced by a variety of factors.
79	Murphy, C. A., & Stewart, J. C. (2015). The Impact of Online or F2F Lecture Choice on Student Achievement and Engagement in a Large Lecture-Based Science Course: Closing the Gap. *Online Learning*, *19*(3), 91-110.	Blended learning options vary and universities are exploring an assortment of instructional combinations, some involving video lectures as a replacement for face-to-face (f2f) lectures. This methodological study investigates the impact of the provision of lecture choice (online or f2f) on overall student achievement and course engagement. This research uses a within-group design to obtain baseline data on a single set of physics students (n = 168), and investigates the impact of providing a lecture viewing choice (online, f2f) mid-semester on student achievement (tests, homework, and standardized conceptual evaluation scores), and course engagement (student lecture viewing, homework submissions, bonus project submissions, and note taking behaviors). The study reveals that the type of lecture does not serve to significantly impact overall student achievement or engagement. However, although recorded and f2f lectures demonstrate an overall educationally equivalent impact, students who elect a high level of recorded lecture use were significantly lower performing and less engaged before the option to watch recorded lectures was introduced and largely continued to be so after the option was introduced, but there was evidence of a reduction in achievement and engagement differences after the option is introduced. Therefore, results of this study suggest weaker performing students self-select higher levels of recorded lecture use, and the use of these video lectures may assist this specific group of students in closing the gap

		between themselves and students who were initially higher performing and more engaged.
80	Neri, L., Noguez, J., Robledo-Rella, V., Escobar-Castillejos, D., & Gonzalez-Nucamendi, A. (2018). Teaching Classical Mechanics Concepts using Visuo-haptic Simulators. *Journal of Educational Technology & Society*, *21*(2), 85-97.	In this work, the design and implementation of several physics scenarios using haptic devices are presented and discussed. Four visuo-haptic applications were developed for an undergraduate engineering physics course. Experiments with experimental and control groups were designed and implemented. Activities and exercises related to classical mechanics concepts were applied in virtual scenarios. The importance of carefully designing haptic scenarios and planning the implementation process to foster greater student engagement was emphasized. The quality of the visualization and friendlier interaction with bodies in the simulation are essential factors. The haptic intervention was evaluated through a perception questionnaire about the use of the visuo-haptic simulators. The results strongly indicate that most students were motivated to use haptic technology. In addition, post-tests were administered to compare the potential learning gains of the experimental and control groups. The results indicate that students in the experimental group obtained greater learning gains than those in the control group in two scenarios. These findings suggest that, by incorporating properly designed visuo-haptic learning environments, students are engaged and motivated to learn physics concepts, thereby supporting better learning outcomes.
81	Neustifter, R., Kukkonen, T., Coulter, C., & Landry, S. (2016). Introducing Backchannel Technology into a Large Undergraduate Course| Introduction d'une technologie d'arrière-plan dans un vaste cours de premier cycle. *Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie*, *42*(1), 1-22.	Backchannel technology can be used to allow students in large lecture courses to communicate with each other and the instructor during the delivery of lecture content and class discussions. It can also be utilized by instructors to capture, summarize, and integrate student questions, ideas, and needs into course content both immediately and throughout the course. The authors integrated backchannel software in one of two sections of a course, leaving the other section as a control; combined, the two sections contained a total number of 871 students. Data was gathered comparing both groups using online surveys and semester grades; results showed that the section using backchannel software had higher class satisfaction and perception of engagement, used their mobile devices more for accessing class content, felt more comfortable participating in class discussions, and had a higher grade average than the section that did not. The authors also explore their own

		experiences of finding, integrating, and maintaining backchannel technology.
82	Ng, K. (2018). Implementation of New Communication Tools to an Online Chemistry Course. *Journal of educators online*, *15*(1), 1-6.	Online courses provide flexibility and convenience for students and have become very popular in recent years. With the advance of technology and change of habits for the uses of traditional communication tools among students, there is a need for educators to explore effective ways to communicate with students that fit their social-media life styles. Two communication tools--web-based text messaging via cellular phone and real-time webinar software--were implemented in a fully online preparatory chemistry course with a full-time working student body. The text messaging system allows the instructor to send short text messages directly to all students' cellular phones while keeping the students' phone numbers anonymous. Important announcements and information were texted to the students' phone number throughout the course. In addition, the instructor conducted individual appointments with each student via webinar software. The number of students who contacted the instructor for course-related inquiries increased 25% after the webinars and 96% of the students turned in all the assignments on time. With the implementation of these two communication tools, the drop-out rate of the course was decreased by 42%. It was concluded that these tools enhanced student engagement and increased the retention rate.
83	Norman, B. A., Budny, D., Patzer II, J. F., Bursic, K. M., Besterfield-Sacre, M., Clark, R. M., ... & Clark, W. W. (2016). Flipping Engineering Courses: A School Wide Initiative. *Advances in Engineering Education*, *5*(3), 1-39.	In the 2013-2014 school year, we implemented the "flipped classroom" as part of an initiative to drive active learning, student engagement and enhanced learning in our school. The flipped courses consisted of freshman through senior engineering classes in introductory programming, statics/mechanics, mechanical design, bio-thermodynamics, facilities layout/material handling, and chemical engineering dynamics and modeling. In the flipped classroom, students watch video lectures beforehand to obtain the foundational knowledge and then demonstrate skills during class. Our study set out to address the following research questions: (1) Does the flipped classroom promote student engagement during class, and does it positively impact the classroom environment? (2) Is the flipped classroom associated with increased student achievement and learning of content? and (3) What strengths, benefits, and drawbacks do students perceive with the

		flipped classroom? To address these, we used a mixed methods approach, including environment and evaluation surveys, instructor interviews, exam and homework results, video access data, and structured classroom observation. Based on our use of the College and University Classroom Environment Inventory (CUCEI), we found evidence that flipped instruction can positively impact the classroom environment. We also used a behavioral observation protocol--the Teaching Dimensions Observation Protocol (TDOP)--to assess student engagement and involvement during class. We compared our results to a national TDOP study of 58 lecture-based STEM classrooms, formally demonstrating the advantages of our flipped classrooms. Behaviors such as student discussion and questions and problem solving were significantly higher in our flipped classrooms (p< 0.0001). Our pre-flip versus flip exam and homework results were mixed from a statistical improvement standpoint. However, based on instructor interviews we noted enhanced higher-order skills such as problem solving and deeper engagement and proficiency in some courses and with some students. Unfortunately, we encountered challenges with our freshman and seniors. The great majority of freshmen did not use the videos for first-time instruction. The seniors expressed resistance to and dissatisfaction with this instructional change. Both freshmen and seniors rated their classroom environments statistically lower than the sophomores and juniors did. We uncovered other instances in the literature of these challenges. Nonetheless, we believe that flipped instruction is a valuable approach for promoting engagement and learning. We discuss lessons learned, including the need to educate students about the expectations of the flipped classroom.
84	Northey, G., Bucic, T., Chylinski, M., & Govind, R. (2015). Increasing student engagement using asynchronous learning. *Journal of Marketing Education*, *37*(3), 171-180.	Student engagement is an ongoing concern for educators because of its positive association with deep learning and educational outcomes. This article tests the use of a social networking site (Facebook) as a tool to facilitate asynchronous learning opportunities that complement face-to-face interactions and thereby enable a stronger learning ecosystem. This student-centered learning approach offers a way to increase student engagement and can have a positive impact on academic outcomes. Using data from a longitudinal quasi-experiment, the authors show that students who participated in both face-to-face on-campus classes and asynchronous online

		learning opportunities were more engaged than students who only attended face-to-face classes. In addition, the findings show that participation in the asynchronous setting relates significantly and positively to students' academic outcomes (final grades). The findings have notable implications for marketing education.
85	Nortvig, A. M., & Sørensen, B. H. (2016). Video Podcasts: Learning by Listening? In A-M. Nortvig, B. Holm Sørensen, M. Misfeldt, R. Ørngreen, B. Allsopp, B. Henningsen, & H. Hautopp (Eds.), *Proceedings for the 5th International Conference on Designs for Learning: Designing New Learning Ecologies* (Pp. 162-174). Aalborg Universitetsforlag.	This project's aim was to support and facilitate master's students' preparation and collaboration by making video podcasts of short lectures available on YouTube prior to students' first face-to-face seminar. The empirical material stems from group interviews, from statistical data created through YouTube analytics and from surveys answered by students after the seminar. The project sought to explore how video podcasts support learning and reflection online and how students use and reflect on the integration of online activities in the videos. Findings showed that students engaged actively in podcasts that included designed activities, and moreover – although to a lesser degree – that students engaged actively in podcasts that did not include additional activities, suggesting that learning via podcast does not always mean learning by passive listening.
86	O'Shea, S., Stone, C., & Delahunty, J. (2015). "I 'feel'like I am at university even though I am online." Exploring how students narrate their engagement with higher education institutions in an online learning environment. *Distance Education*, *36*(1), 41-58.	This article outlines a collaborative study between higher education institutions in Australia, which qualitatively explored the online learning experience for undergraduate and postgraduate students. The project adopted a narrative inquiry approach and encouraged students to "story" their experiences of this virtual environment, providing a snapshot of how learning is experienced by those undertaking online studies. The study explores what impacted upon students' engagement in this environment and how different facets of their learning experience made a qualitative difference to how individuals enacted engagement. Drawing upon Sharon Pittaway's engagement framework, the article seeks to foreground student voice as the learners define their engagement in learning, the strategies they employed to assist this process and how engagement was enacted at an individual level. The students' reflections presented in this article can be used to inform teaching and learning strategies designed to improve engagement in the online environment within the higher education sector.
87	Oh, E., & Kim, H. (2016). Understanding cognitive engagement in online discussion: Use of a scaffolded,	The purpose of this paper is to explore how adult learners engage in asynchronous online discussion through the implementation of an audio-

	audio-based argumentation activity. *International Review of Research in Open and Distributed Learning: IRRODL*, *17*(5), 28-48.	based argumentation activity. The study designed scaffolded audio-based argumentation activities to promote students' cognitive engagement. The research was conducted in an online graduate course at a liberal arts university. Primary data sources were learners' text-based discussions, audio-recorded argumentation postings, and semi-structured interviews. Findings indicate that the scaffolded, audio-based argumentation activity helped students achieve higher levels of thinking skills as well as exert greater cognitive efforts during discussions. In addition, most students expressed a positive perception of and satisfaction with their experience. Implications for practice and future research areas are discussed.
88	Orcutt, J. M., & Dringus, L. P. (2017). Beyond being there: Practices that establish presence, engage students and influence intellectual curiosity in a structured online learning environment. *Online Learning*, *21*(3), 15-35.	To fully understand teaching presence and its implications for the intellectual climate of an online classroom it is necessary to explore the phenomenon from the perspective of the instructors who experience it. Informed by the theoretical perspective of the Community of Inquiry (CoI) model, the actions, intentions and perceptions of instructors were investigated through a collective case study. The goal of this study was to examine the decision processes employed in establishing teaching presence in a structured online environment in order to make a contribution to the body of knowledge from a practical pedagogical perspective. Using the lived experiences of instructors enabled the exploration of the influence pedagogical choices had on the creation of an intellectual climate in the online context. Using semi-structured interviews as the main source of data, the study utilized the Interpretative Phenomenological Analysis (IPA) method as an analytical tool to address concerns of rigor in the qualitative interpretation of experiential data. Results of the collective case revealed student engagement and intellectual curiosity were influenced most greatly by an instructor's active interest and passion for teaching, an ability to identify the relevance of course topics to the student, and the encouragement for a shared responsibility in the learning process. The findings showed that the shared goal of learning extended beyond the stated learning objectives and expected outcomes of a course and served as a foundation in the creation of authentic relationships between instructor and students. In addressing the overarching research question of how instructors establish teaching presence and inspire intellectual curiosity in a structured teaching

		environment, the findings of this study contribute to knowledge related to the nature of teaching presence and its role in setting an academic climate in an online classroom.
89	Paiva, R. C., Ferreira, M. S., & Frade, M. M. (2017). Intelligent tutorial system based on personalized system of instruction to teach or remind mathematical concepts. *Journal of Computer Assisted Learning*, *33*(4), 370-381.	The growth of the higher education population and different school paths to access an academic degree has increased the heterogeneity of students inside the classroom. Consequently, the effectiveness of traditional teaching methods has reduced. This paper describes the design, development, implementation and evaluation of a tutoring system (TS) to improve student's engagement in higher mathematics. The TS design was based on the Personalized System of Instruction of the Mastery Learning pedagogical approach and can be implemented in any higher education course with mathematics needs. The TS consists on small self-paced modularized units of educational contents, including tutorial videos, notes and formative e-assessment with personalized feedback. The TS ensures that the student is only allowed to proceed to the next unit after he or she achieves the required mastery criterion of the current unit. The TS was implemented in the Quantitative Methods course of an undergraduate degree and received good acceptance from students. It was also recognized that TS contributed to learning and engagement with the discipline. Through an experimental research experience, it has been shown that the imposition of restrictions on the advance to the next level by a mastery criterion leads to a significant improvement in student's engagement and performance. Lay Description What is already known about this topic? The Information and Communication Technologies have a great potential for any individualized math teaching program. There are advantages of the implementation of the Personalized System of Instruction pedagogy in higher mathematics. The tutorial systems may improve student's engagement and performance. The transcription of paper-based mathematics examinations into an electronic format is feasible for a significant proportion of the questions as currently assessed. What this paper adds: The use of an online tutorial system with design based on the Personalized System of Instruction leads to a significant improvement in student's engagement and performance. Using e-assessments with formative feedback is feasible as self-assessment tool. The positive effects in student's engagement and performance are boosted by the

		imposition of mandatory mastery criteria on the advance to the next level. Implications for practice and/?or policy: Efforts should be made to make the tutorial systems of mathematics more attractive. The implementation of online exercises in which the number of fields is defined by the student may provide an important improvement in the interaction for some types of questions.
90	Pallas, J., Eidenfalk, J., & Engel, S. (2019). Social networking sites and learning in international relations: The impact of platforms. *Australasian Journal of Educational Technology*, *35*(1), 16-27.	This article reports on a pilot undergraduate subject that incorporated a range of technology-enhanced learning approaches including online lectures, an online site for in and out of class communications, and strong encouragement for students to blog and use Twitter. This paper evaluates student engagement through the social networking sites (SNS), focusing on the online communication and content platform. We examine whether changing from an educationally oriented SNS platform to Facebook impacted on student engagement and feedback. To achieve this, both empirical data and qualitative student feedback were used.
91	Park, S., & Yun, H. (2018). The influence of motivational regulation strategies on online students' behavioral, emotional, and cognitive engagement. *American Journal of Distance Education*, *32*(1), 43-56.	Providing effective motivational support is a critical determinant of a successful online distance learning experience for students in higher education. In this study, we examined how students' academic level and use of 8 motivational regulation strategies influence 3 types of student engagement: behavioral engagement, emotional engagement, and cognitive engagement. A total of 95 undergraduate and graduate students enrolled in online courses in 4-year universities in the United States participated in this study. A series of hierarchical regression analyses of undergraduate and graduate online students ($N = 95$) showed that behavioral engagement, emotional engagement, and cognitive engagement are predicted by different motivational regulation strategies after controlling for the academic level. Additionally, students' academic level was found to be a predictor of cognitive engagement but not a predictor of behavioral engagement or emotional engagement. The results suggest that online course instructors, tutors, and designers should provide students with differentiated motivational scaffolding based on their motivational profile in order to promote different aspects of learning engagement.
92	Pellas, N., & Kazanidis, I. (2015). On the Value of Second Life for Students' Engagement in Blended and	Nowadays three-dimensional (3D) multi-user virtual worlds (VWs) are the most well-known candidate platforms in Higher education. Despite the

	Online Courses: A Comparative Study from the Higher Education in Greece. Education and Information Technologies, 20(3), 445-466. doi:http://dx.doi.org/10.1007/s10639-013-9294-4	growing number of notable studies that have presented VWs as valuable platforms for the e-Education, there is still a paucity of a comparative study in order to be determined the degree of the students' engagement in constructionist-collaborative learning scenarios. Concurrently, it seems imperative the need for educators and scholars to identify how can VWs influence students' engagement in contemporary and reliable instructional formats, mainly on blended or online settings for university-level courses. In this study the effects of students' achievements were measured by comparing the degree of students' engagement from two student groups (graduate and undergraduate) enrolled in two different instructional formats (blended/online) held in Second Life (SL) to become learning content developers. The purpose of the current research is to present results from the comparative study of one hundred twenty-five (125) students that finally attended in order to be measured their engagement overall as a multi-dimensional construct consisting of the emotional, behavioral and cognitive factors. The study findings from the quantitative analysis have disclosed that graduate students who participated in online courses achieved more positive learning outcomes and as a result the degree of their engagement was significantly increased than those who enrolled with the blended. In these circumstances there are raised some fundamental educational implications which are also discussed.
93	Pickering, J. D., & Swinnerton, B. J. (2019). Exploring the dimensions of medical student engagement with technology-enhanced learning resources and assessing the impact on assessment outcomes. *Anatomical sciences education*, *12*(2), 117-128.	Anatomy curricula are becoming increasingly populated with blended learning resources, which utilize the increasing availability of educational technology. The educational literature postulates that the use of technology can support students in achieving greater learning outcomes by increasing engagement. This study attempts to investigate the dimensions of student engagement with technology-enhanced learning (TEL) resources as part of a medical program's anatomy curriculum using exploratory factor analysis. A 25-item five-point Likert-based survey was administered to 192 first-year medical students, with three emergent factors discerned: satisfaction, goal setting and planning, and physical interaction. The three factors closely aligned with the existing literature and therefore additional nonparametric analysis was conducted that explored the levels of engagement across three custom-made anatomy TEL resources, including: (1) anatomy drawing

		screencasts; (2) an eBook; and (3) a massive open online course (MOOC). Usage data indicated that the most popular resource to be accessed across the cohort was the anatomy drawing screencasts via YouTube, with the MOOC being used least. Moreover, some evidence suggests that those students who utilized the MOOC were more engaged. Generally, however, no correlations were observed between the levels of engagement and TEL resource usage or assessment outcomes. The results from this study provide a clear insight into how students engage with TEL resources, but do not reveal any relationship between levels of engagement, usage, and assessment outcomes.
94	Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices. *Management Teaching Review*, *2*(2), 151-158.	Instructional games are gaining acceptance in the classroom as the eLearning merits of student engagement and immediate feedback are recognized. Within higher education, the use of these tools is often limited due to lack of time, insufficient experience, or doubts regarding the scholarly merits of such activities. Kahoot! is a popular eLearning tool that can easily be used to add vitality, student engagement, and meta-cognitive supports to higher education classrooms with limited instructor or student training required. The free online learning platform has gained wide acceptance globally with more than 30 million users worldwide, and it is based on current user-centered and behavioral design methodologies. Student responses and our experiences using Kahoot! in graduate and undergraduate classrooms indicate that students welcome the use of this game. The real-time feedback provides opportunities for professors in various disciplines to tailor their instruction based on student understanding on quizzes while the surveys allow for anonymous classroom participation, which further engages all students.
95	Porcaro, P. A., Jackson, D. E., McLaughlin, P. M., & O'Malley, C. J. (2016). Curriculum design of a flipped classroom to enhance haematology learning. *Journal of Science Education and Technology*, *25*(3), 345-357.	A common trend in higher education is the "flipped" classroom, which facilitates active learning during class. The flipped approach to teaching was instituted in a haematology "major" class and the students' attitudes and preferences for the teaching materials were surveyed. The curriculum design was explicit and involved four major components (1) the preparation of the students; (2) the weekly pre-class work; (3) the in-class active learning strategies and (4) closing the learning loop using formative quizzes. Each of these components is discussed in detail and was informed by sound

		pedagogical strategies. Several different sources of information and several freely available software tools to engage the students are discussed. Two iterations are reported here, with improved pass rate for the final examination from 47 to 48% in the traditional class to 56-65% in the flipped classroom approach. The majority of students (93 and 89%) came to the class prepared, after viewing the screencasts and engaged fully with the activities within the face-to-face time. The students perceived that solving case studies (93%) was the most beneficial activity for their learning and this was closely followed by the production of essay plans (71%). The majority of students recommended that this approach be repeated the following year (69 and 75%).
96	Prestridge, S. (2014). A focus on students' use of Twitter–their interactions with each other, content and interface. *Active Learning in Higher Education*, *15*(2), 101-115.	In their advertising campaigns, universities depict students using computers, laptops, mobile phones, iPads and tablets as learning devices. Regardless of the marketing used, there is value in enlisting the advantages of any medium that can aid deep thinking and increase student engagement. This study offers new knowledge about conceptualising Twitter as a knowledge construction tool leveraged through mobile devices. A qualitative approach was conducted to investigate the learning outcomes of students' use of Twitter when it was implemented as a learning device. The use of Twitter was investigated to provide insight into the ways students and instructors interacted in this environment, how the content was made active and how the functionality of the tool and its conceptualisation impedes and/or supports the learning process. The results indicate that student-initiated interaction supported by instructor use of participatory pedagogies enables substantive dialogue through Twitter and that paraphrasing was the most common way students made learning active.
97	Rasi, P., & Vuojärvi, H. (2018). Toward personal and emotional connectivity in mobile higher education through asynchronous formative audio feedback. *British Journal of Educational Technology*, *49*(2), 292-304.	This study aims to develop asynchronous formative audio feedback practices for mobile learning in higher education settings. The development was conducted in keeping with the principles of design-based research. The research activities focused on an inter-university online course, within which the use of instructor audio feedback was tested, analyzed and developed further. Participants in this study were students (n = 50) from four Finnish universities who enrolled in the 7-week course. The teaching approach of the course could best be characterized as collaborative case-based mobile

		learning. Furthermore, we employed a novel formative audio feedback practice that has been inspired by and follows the peer-review practices employed by scientific journals. In particular, we wanted to find out how students experienced the use of audio feedback in terms of utility, emotional support and learning. Research data was gathered through a questionnaire to the course students, transcribed audio feedback provided for the students and students' performance results. The study indicates that the novel formative audio feedback practice was successful in promoting the emotional engagement of students and personal connectivity between students and instructors. Furthermore, the audio feedback proved effective in terms of assignment revisions, and also in terms of students' self-reports of the meaning of the audio feedback for learning. The majority of students welcomed the audio feedback, and also expressed a wish for the integrated use of text and audio. Therefore, in future implementations, we will integrate the audio and written feedback.
98	Ravenscroft, B., & Luhanga, U. (2018). Enhancing student engagement through an institutional blended learning initiative: A case study. *Teaching & Learning Inquiry*, *6*(2), 97-114.	Tertiary education institutions grapple with how to better engage students in their learning in high-enrolment, introductory courses. This paper presents a case study that examines a large-scale, faculty-level course redesign project in which this challenge was addressed through the use of blended learning models. The main research question was: Are students in blended formats engaged in their learning differently than those in the traditional formats? The first part of this paper describes the institutional policies, processes, and practices that were established to implement the course redesign project. The second part of the paper focuses on the effectiveness of the project, presenting the results of a longitudinal research study that examined changes in student engagement using the Classroom Survey of Student Engagement (CLASSE). The implications of the longitudinal evaluation and institutional strategy, structure, and support components are examined critically, as well as the project's impact on students and on the larger university.
99	Ravishankar, J., Epps, J., & Ambikairajah, E. (2018). A flipped mode teaching approach for large and advanced electrical engineering courses. *European Journal of Engineering Education*, *43*(3), 413-426.	A fully flipped mode teaching approach is challenging for students in advanced engineering courses, because of demanding pre-class preparation load, due to the complex and analytical nature of the topics. When this is applied to large classes, it brings an additional complexity in terms of promoting the intended active learning. This paper presents a novel selective

		flipped mode teaching approach designed for large and advanced courses that has two aspects: (i) it provides selective flipping of a few topics, while delivering others in traditional face-to-face teaching, to provide an effective trade-off between the two approaches according to the demands of individual topics and (ii) it introduces technology-enabled live in-class quizzes to obtain instant feedback and facilitate collaborative problem-solving exercises. The proposed approach was implemented for a large fourth year course in electrical power engineering over three successive years and the criteria for selecting between the flipped mode teaching and traditional teaching modes are outlined. Results confirmed that the proposed approach improved both students' academic achievements and their engagement in the course, without overloading them during the teaching period.
100	Remón, J., Sebastián, V., Romero, E., & Arauzo, J. (2017). Effect of using smartphones as clickers and tablets as digital whiteboards on students' engagement and learning. *Active Learning in Higher Education*, *18*(2), 173-187.	This work addresses the use of tablets and smartphones to enhance both student learning and engagement. Tablets were tested as potential substitutes for digital whiteboards, while smartphones were tested as potential survey media in the classroom using a question and answer method. Two teaching strategies were evaluated and compared: (1) traditional, which includes the use of the blackboard together with PowerPoint presentations and (2) interactive, where lessons are taught with the aid of a tablet, using interactive activities and digital materials. Measures of performance outcomes achieved with these strategies were made using the question and answer method at two points, during the classes and during the end-of-term examination. Three different question and answer methodologies were studied and compared, ranging from the very traditional method where students raise their hand to answer a question to the most modern where students use their smartphones to answer. The findings demonstrated higher outcomes with interactive lessons than with traditional learning (PowerPoint included). Tablets proved to be an effective and cheaper substitute for interactive whiteboards during lessons. The results suggested that the use of interactive procedures increased student participation. Furthermore, the students were very receptive to the use of smartphones as survey media. The use of smartphones as clickers is an interesting and instant way for both teachers and students to check students' learning and perceived engagement.

		Considering that students are advanced users of smartphones and/or tablets, the use of these may be considered as more convenient than clickers. In addition, it is economically more acceptable than some other audience response systems.
101	Ribeiro, S. P. M. (2016). Developing intercultural awareness using digital storytelling. *Language and Intercultural Communication*, *16*(1), 69-82.	Higher Education mirrors the shifting nature of society and work. Mobility may provide unparalleled learning opportunities for all stakeholders; however, in order to live and work in plural societies as socially responsible and intercultural knowledgeable citizens, intercultural awareness and intercultural communication skills need to be mastered. In parallel, the relevance of a digital agenda and the studies that attest to the positive student engagement brought about by the inclusion of information and communication technologies (ICT) across all grade levels push educators to seek and incorporate technology-based learning and teaching strategies. Digital Storytelling was implemented in an undergraduate degree in Business Communication, where students discuss and reflect on key issues in Intercultural Communication. Our case study draws on the qualitative analysis of a questionnaire, which intended to understand student perceptions regarding an assignment where they are asked to create Digital Stories and consider on the their own reflection process regarding intercultural differences and communicating across cultures. Our analysis of the 140 questionnaires revealed that Digital Storytelling was able to engage students in a serious and productive debate revolving around technology-enhanced learning and cultural differences, empowering them to construct new personal and group meanings and improve their intercultural awareness.
102	Roberts, J. C. (2015). Evaluating the effectiveness of lecture capture: lessons learned from an undergraduate political research class. *Journal of Political Science Education*, *11*(1), 45-60.	This article presents the results of a 4-year quasi-experimental study of the effectiveness of lecture capture in an undergraduate political research class. Students self-enrolled in either a traditional in-class lecture-discussion section or a fully online section of a required political research course. The class sessions from the in-class section were recorded and provided asynchronously to the online students. The instructor, course assignments, exams, and supplemental materials were the same for the in-class and online sections. The two types of sections were compared on course-embedded academic performance measures and on the completion rates of the course and of the course assignments, controlling for prior cumulative grade point

		average (GPA), prior credits completed, and gender. The mean overall course score for the online students was slightly, but significantly, lower than scores for the in-class students. The students' GPAs interacted with the type of section such that the difference between in-class and online academic performance diminished or disappeared among students with higher GPAs. Completion rates for the course and for assignments were significantly lower for online students. Strategies for addressing these problems through greater student engagement are widely cited, but recent empirical tests of these strategies have not provided satisfactory results.
103	Robson, D., & Basse, B. (2018). Advantages and Disadvantages of an Innovative Tablet Technology Learning Activity: A Ten Year Case Study in Small Tertiary Mathematics Classrooms. *Journal of Information Technology Education: Innovations in Practice*, *17*(1), 225-239.	Aim/Purpose: To identify positive and negative aspects for learning of interactive tablet technology learning activities that promote student engagement and learning. Background: Engaging students in mathematics classes is an on-going challenge for teachers. In 2008 we were offered the opportunity to run interactive activities with a class set of tablet PCs that had just been released on to the market. Since then, we have run these interactive activities continuously with mathematics classes for computing students, albeit with two changes in hardware. Methodology: In the interactive activities, students submit full worked solutions to various problem types (classified as table, text, open or multi-choice) which can then be displayed to the class anonymously, discussed and annotated by the teacher. We surveyed student and staff perceptions and monitored academic performance. Contribution: We have over 10 years of results, observations, and experience from 2008, when tablet technologies were new and expensive, to the current time, when modern tablets with styli are now affordable. Findings: There was a significant increase in higher grades although pass rates did not increase significantly. Over the ten year period of the study, perceptions of students and staff about how this technology impacted on student learning were consistently positive. The majority of students found all problem types useful for learning even those they rated "too hard" or "too easy". Benefits included increased feedback, peer learning and engagement. Recommendations for Practitioners: We recommend using tablet learning activities to engage students and teachers and to contribute to learning. Impact on Society: This study shows how using tablet technologies for interactive classroom activities can enable and enhance known

		pedagogies of feedback, peer instruction, and student engagement for mathematics classes. Future Research: We recommend extending this study to include larger classes, and other technical subjects that use symbols and diagrams. In addition, we suggest considering control groups.
104	Sawang, S., O'Connor, P., & Ali, M. (2017). IEngage: Using Technology to Enhance Students' Engagement in a Large Classroom. *Journal of Learning Design, 10*(1), 11-19.	This paper aims to answer how we can increase students' engagement in a large class. We hypothesised that the use of KeyPad, an interactive student response system, can lead to enhanced student engagement in a large classroom. We tested a model of classroom technology integration enhancing the students' engagement among first year undergraduate students (n = 131). This study provides evidence of significant effect of positive attitude and social pressure on the intent to use KeyPads. In turn, the intent to use KeyPads leads to the actual use of KeyPads which is directly associated with the level of student engagement. In addition, we find evidence for the relationship between extraversion and level of engagement such that compared to extrovert students, introvert students felt more engaged.
105	Scagnoli, N. I., Choo, J., & Tian, J. (2019). Students' insights on the use of video lectures in online classes. *British Journal of Educational Technology*, *50*(1), 399-414.	Video lectures (VL), considered an effective means for delivering course content and infusing teaching presence in the virtual environment, have become very popular in education. The purpose of this study was to investigate online student experiences with VL focusing on their opinion of usefulness of VL, their satisfaction with them and their perception of learning derived from them. Our findings show that students' satisfaction with VL has a strong relationship with positive overall learning experience and perception of impact of video on learning. Furthermore, VL can enhance a feeling of engagement with content because of learners' control of the media and instructors' presence. The findings also alert us on the importance of careful planning and balanced integration of VL with other course materials. This provides important information on the effectiveness of video-lectures in college teaching and learning and implications for practice in online course design.
106	Schefer-Wenzl, S., & Miladinovic, I. (2018). Teaching software engineering with gamification elements. *International Journal of Advanced Corporate Learning*, *11*(1), 48-51.	Students of software engineering courses in higher education often experience a lack of motivation, partly caused by traditional teaching methods. In our study program we introduced a novel blended learning concept with threefold gamification elements for teaching software

		engineering. In this paper we present the teaching method mix with particular focus on the integration of three gamification elements to increase students' engagement.
107	Schiele, K., Matzen, R. N., & Bridgewater, M. (2017). Using e-portfolios to demonstrate high-impact educational practices and promote student employment success. *Journal of Higher Education Theory and Practice*, *17*(1), 102-109.	This paper presents e-Portfolios as an innovative platform to document student learning and promote reflection throughout their university experience. e-Portfolios allow students to demonstrate their engagement with high-impact practices derived from American Association of Colleges and Universities (AACU): study away, leadership, internship/work, civic engagement, and undergraduate research. Using results from an employers' panel and student surveys, this paper empirically evaluates students' engagement with the university, marketing curriculum, and e-Portfolio projects. Among other findings, e-Portfolios improve student satisfaction with their overall undergraduate education, add value to the contemporary marketing curriculum, improve student's employment search after graduation, and create new assessment opportunities.
108	Seery, M. K. (2015). ConfChem conference on flipped classroom: Student engagement with flipped chemistry lectures. *Journal of Chemical Education*, *92*(9), 1566-1567.	This project introduces the idea of "flipped lecturing" to a group of second-year undergraduate students. The aim of flipped lecturing is to provide much of the "content delivery" of the lecture in advance, so that the lecture hour can be devoted to more in-depth discussion, problem solving, and so on. As well as development of the material, a formal evaluation was conducted. Fifty-one students from a year 2 chemical thermodynamics module took part in this study. Students were provided with online lectures in advance of their lectures. Along with each online lecture, students were given a handout to work through as they watch the video. Each week, a quiz was completed before each lecture, which allowed students to check their understanding and provided a grade for their continuous assessment mark. The evaluation examines both the students' usage of materials and their engagement in lectures. This involves analysis of access statistics, along with an in-class cognitive engagement instrument. The latter is measured by "interrupting" students as they work through a problem and asking four short questions, which aim to examine how students were engaging with the materials in that moment. Results from this, along with access data, quiz scores, and student comments, aim to build up a profile of how the flipped lecture works for middle stage undergraduate students. This communication summarizes one

		of the invited papers to the ConfChem online conference Flipped Classroom, held from May 9 to June 12, 2014 and hosted by the ACS DivCHED Committee on Computers in Chemical Education (CCCE).
109	Selwyn, N. (2016). Digital downsides: Exploring university students' negative engagements with digital technology. *Teaching in Higher Education*, *21*(8), 1006-1021.	Digital technologies are now an integral feature of university study. As such, academic research has tended to concentrate on the potential of digital technologies to support, extend and even "enhance" student learning. This paper, in contrast, explores the rather more messy realities of students' engagements with digital technology. In particular, it focuses on the aspects of digital technology use that students see as notably unhelpful. Drawing on a survey of 1658 undergraduate students from two Australian universities, the paper highlights four distinct types of digital "downside". These range from low-level annoyances and interruptions, to ways in which digital technologies are seen to diminish students' scholarship and study. Against this background, the paper considers how discussions of digital technology might better balance enthusiasms for what we know might be achieved through technology-enabled learning, with the often unsatisfactory realities of students' encounters with digital technology.
110	Sharma, P., & Tietjen, P. (2016). Examining patterns of participation and meaning making in student blogs: A case study in higher education. *American Journal of Distance Education*, *30*(1), 2-13.	This article reports on the use of blogs in an online course over multiple semesters and analyzes the participation and meaning making between course participants. The authors used a combination of social network analyses and discourse analysis to show the patterns of participation and the types of meaning making over two iterations of the course. The authors identified that patterns of participation were consistent with the course design and that blogs offer a viable medium to engage students authentically in Web 2.0 practices and to support meaning making and collaborative learning. Based on the data, recommendations are made for integrating social media in formal course designs.
111	Shaw, C. S., & Irwin, K. C. (2017). Forum quality or quantity: What is driving student engagement online?. *Online Journal of Distance Learning Administration*, *20*(3).	The purpose of this study was to determine the relationship between forum quality and student engagement. It was hypothesized when the forum prompt was of expected quality it would be a driver of student engagement and examined the length of the forum prompt in relation to student engagement. The methodology adopted for this study was quantitative--a regression was performed for the regressor variables, collectively, with each dependent variable. In addition, a standard regression was performed for

		quality of forum prompt with each dependent variable, separately. Data was collected over an eight-month period from May through December of 2015 from the following programs within the School of Business in an online university: accounting, business administration, government contracting, economics, entrepreneurship, finance, hospitality, human resource management, management, marketing, retail management, reverse logistics management, and transportation and logistics management. We examined the theory established by Salmon regarding the 5-stage model for forum development: (1) access and motivation, (2) online socialization, (3) information exchange, (4) knowledge construction, and (5) development. It was determined stages one and two are critical for student engagement as the more in depth the prompt the less likely students were to engage.
112	Shaw, J., Kominko, S., & Terrion, J. L. (2015). Using LectureTools to enhance student–instructor relations and student engagement in the large class. *Research in Learning Technology, 23*. https://doi.org/10.3402/rlt.v23.27197	Positive student-instructor relationships are important for student engagement, motivation, retention and achievement. Yet, as class sizes grow, these relationships can be increasingly difficult to develop. This study explores LectureTools--a web-based student response and learning platform that facilitates communication between instructors and students--as a possible solution to this issue by analysing survey data collected from students in a second-year communication class at a large Canadian university. This study builds on previous evidence that using LectureTools results in an increase in student engagement, attentiveness and level of learning, while expanding on this work to include the concept of student instructor relationships. Ultimately, the functionality of LectureTools was found to facilitate the development of student-instructor relationships in the large class while also enhancing student engagement.
113	Sobocan, M., & Klemenc-Ketis, Z. (2017). Medical students' attitudes towards the use of virtual patients. *Journal of Computer Assisted Learning*, *33*(4), 393-402.	An increasing number of virtual patients (VPs) are being used in the classroom, which raises questions about how to implement VPs to improve students' satisfaction and enhance their learning. This study developed and validated a scale that measures acceptability and attitudes of medical students towards the use of the VP education tool in the classroom. This mixed method study first explored attitudes with 11 students in two focus groups. Later on, eight experts performed item reduction and transformation through three rounds of the Delphi-study method, and an initial version of the scale [virtual patient integration rating scale (VPIRS)] was developed.

		The scale was administered among 138 medical students to determine its reliability. A total of 88 medical students responded to the final version of the VPIRS. Principal component analysis was performed in order to determine questionnaire domains. The final, validated scale contains 25 items in four domains, with a reliability of 0.864. The identified domains are as follows: (1) acquiring and maintaining knowledge, (2) facilitation of learning, (3) inauthentic learning and (4) disadvantages of learning. To the best of our knowledge, this is the first time a VP rating scale has been developed. VPIRS allows for targeted engagement with students regarding learning and evaluation with VPs, thereby providing opportunities for student-centred teaching.
114	Song, D., Oh, E. Y., & Glazewski, K. (2017). Student-generated questioning activity in second language courses using a customized personal response system: a case study. *Educational Technology Research and Development*, *65*(6), 1425-1449.	This case study reports on the implementation of student-generated questioning using a customized personal response system (PRS) by two groups of students in second language (L2) courses at a university in the United States. This study aimed to understand more about instructor and student experience with student-generated questioning for promoting student interaction in the L2 classroom, and sources for investigation included class observation, instructor interview, student survey, and pre/post-test. The results of this study indicated that the classroom interaction could be fostered through student-generated questioning with the support of PRS in L2 courses. In addition, there was a significant difference in students' achievement between the pre- and post-test. The results are consistent with the findings of previous studies that student-generated questioning fosters collaborative interactions and increases frequency of student engagement. The results also suggest that the adoption of student-generate questioning with a technology support may result in promoting classroom interactions where the students are able to practice the target language through conversation with an instructor and peers.
115	Speicher, O., & Stollhans, S. (2015). Feedback on feedback – does it work?. In F. Helm, L. Bradley, M. Guarda, & S. Thouësny (Eds.), *Critical CALL – Proceedings of the 2015 EUROCALL Conference, Padova, Italy* (pp. 507-511). Dublin: Research-	It is well documented that providing assessment feedback through the medium of screencasts is favourably received by students and encourages deeper engagement with the feedback given by the language teacher (inter alia Abdous & Yoshimura, 2010; Brick & Holmes, 2008; Cann, 2007; Stannard, 2007). In this short paper we will report the results of a case study where students moved from passively receiving feedback to actively

	publishing.net. http://dx.doi.org/10.14705/rpnet.2015.000384	entering into a feedback dialogue with their language teachers: screencasts were used not only by the teachers to provide audio and visual feedback to students on their written work, but also by the students themselves to comment in depth on the feedback they had received. Participants in the case study were surveyed at the end of the semester, and we will report on the survey findings as well as discuss the limitations and implications of the case study. The paper will reflect on the potential role of technology in providing feedback, the effectiveness of elicitation feedback in the context of this case study and the students' perception of the usefulness of creating their own screencasts in response to the feedback they have received. [For full proceedings, see ED564162.]
116	Steadman, R. G. (2015). Establishing an Atmosphere for Critical Thinking in the Online Classroom. *Journal of Instructional Research*, *4*, 3-11.	Metacognition and critical thinking are crucial elements in the educational process. The following article examines the use of a quiz/poll classroom assessment technique (CAT) in a 100-level Christian worldview classroom (CWV-101) designed to stimulate student engagement with the course principles in a self-reflective and non-threating environment, thus establishing an atmosphere for critical thinking. The quiz/poll CAT is explained and its underlying inspiration explored to provide insight on the effectiveness of classroom assessment techniques in the online environment.
117	Steele, J. P., Robertson, S. N., & Mandernach, B. J. (2018). Beyond Content: The Value of Instructor-Student Connections in the Online Classroom. *Journal of the Scholarship of Teaching and Learning*, *18*(4), 130-150.	Research clearly establishes the value of online education to foster students' cognitive understanding of course material. However, engagement in the learning experience requires more than mere acquisition of new knowledge; to be fully engaged in the learning process, students must also connect with their peers and instructor in a meaningful way. The purpose of this study is to examine the value of instructor-personalized audio lectures as means of fostering students' engagement with course content and the online learning experience. Qualitative data on the student experience found that instructor-personalized audio lectures enhanced students' perceptions of value and engagement; quantitative data using a standardized engagement measure revealed no significant differences. Students' qualitative feedback about their online learning experience indicated that instructor-personalized audio lectures fostered greater student-instructor connections and significantly impacted the likelihood of students' engaging with course material. Recognizing the value of student engagement for ongoing satisfaction and

		retention in online learning programs, findings suggest that the creation of personalized audio lectures provides an efficient and effective means for faculty to positively impact students' online learning experience.
118	Sullivan, D., & Watson, S. (2015). Peer Assessment within Hybrid and Online Courses: Students' View of Its Potential and Performance. *Journal Of Educational Issues*, *1*(1), 1-18.	The scale and scope of online education increasingly expand. In tandem, interest grows among educators and scholars in understanding the personal and contextual factors that moderate the efficient design and effective delivery of an online course. This paper looks at a theoretically robust method, peer assessment administered by the Canvas learning management system, and evaluates its potential and performance in university-level hybrid and online courses. Cross-sectional data profile students' views, both prior to as well as post-experience, of aspects of the peer review process. Frequency analyses, mean comparisons, and t-tests highlight students' initial strong, positive agreement with the potential but then, post-experience, weaker support of the value of peer assessment. Controlling for time and place, in terms of hybrid versus online sections, did not moderate this outcome. Collectively, these results call for refining our interpretation of the utility of peer assessment to promoting student engagement. We evaluate the moderating influence of anonymity and the social dynamic of self-directed learning, particularly given the implications of the "anytime, anyplace" instrumentality of online education. We close with a series of pedagogical recommendations.
119	Sun, J. C. Y., Martinez, B., & Seli, H. (2014). Just-in-time or plenty-of-time teaching? Different electronic feedback devices and their effect on student engagement. *Journal of Educational Technology & Society*, *17*(2), 234-244.	This study examines how incorporating different electronic feedback devices (i.e., clickers versus web-based polling) may affect specific types of student engagement (i.e., behavioral, emotional, and cognitive engagement), whether students' self-efficacy for learning and performance may differ between courses that have integrated clickers and those that use web-based polling, and whether using web-based polling influences faculty members' instructional practices. The participants included six instructors and 209 students enrolled in classes at a university in the southwestern United States in which the instructors used either clickers or web-based polling. The Plenty-of-Time Teaching (PoTT) and the Just-in-Time Teaching (JiTT) approaches and their implications are presented. The results of this study highlight the benefits of using various types of electronic feedback devices to provide innovative ways to implement JiTT or PoTT, such as gauging

		students' understanding with pre-class polls, and offer insights that can benefit educators who wish to promote students' emotional and cognitive engagement with various types of feedback devices.
120	Thomas, M. P., Türkay, S., & Parker, M. (2017). Explanations and interactives improve subjective experiences in online courseware. *International Review of Research in Open and Distributed Learning*, *18*(7), 213-241.	As online courses become more common, practitioners are in need of clear guidance on how to translate best educational practices into web-based instruction. Moreover, student engagement is a pressing concern in online courses, which often have high levels of dropout. Our goals in this work were to experimentally study routine instructional design choices and to measure the effects of these choices on students' subjective experiences (engagement, mind wandering, and interest) in addition to objective learning outcomes. Using randomized controlled trials, we studied the effect of varying instructional activities (namely, assessment and a step-through interactive) on participants' learning and subjective experiences in a lesson drawn from an online immunology course. Participants were recruited from Amazon Mechanical Turk. Results showed that participants were more likely to drop out when they were in conditions that included assessment. Moreover, assessment with minimal feedback (correct answers only) led to the lowest subjective ratings of any experimental condition. Some of the negative effects of assessment were mitigated by the addition of assessment explanations or a summary interactive. We found no differences between the experimental conditions in learning outcomes, but we did find differences between groups in the accuracy of score predictions. Finally, prior knowledge and self-rated confusion were predictors of post-test scores. Using student behavior data from the same online immunology course, we corroborated the importance of assessment explanations. Our results have a clear implication for course developers: the addition of explanations to assessment questions is a simple way to improve online courses.
121	Tiernan, P. (2014). A study of the use of Twitter by students for lecture engagement and discussion. *Education and Information Technologies*, *19*(4), 673-690.	Research indicates that student engagement with lectures, and participation in discussion and debate, greatly improve their learning and experience of University. The nature of some lectures means they can lack opportunities for interaction and active learning. For this reason it can be difficult for some students, especially students new to University, to fully engage in lectures, and interact with their peers. This study attempts to use Twitter as a means of increasing these opportunities for interaction and engagement for

		students, especially those who may lack the confidence to engage traditionally. As a first step, the study analyses the use of Audience Response Systems to understand the role technology can play in providing opportunities for interaction. Following this, a review of experiments conducted using Twitter is carried out. While there is a dearth of research in this area, these cases provide some valuable insights into the use of this technology and its integration into education. In the methodology section, the process of using Twitter in lectures is explained, along with some of the challenges and obstacles faced. Findings presented indicate that while adoption of Twitter was low, the platform provides engagement opportunities for timid members of the group, while having a generally positive impact on engagement and discussion for the group as a whole. Finally, emerging uses of the Twitter platform are examined, allowing the reader glimpse possibilities for future integration.
122	Trenholm, S., Hajek, B., Robinson, C. L., Chinnappan, M., Albrecht, A., & Ashman, H. (2019). Investigating undergraduate mathematics learners' cognitive engagement with recorded lecture videos. *International journal of mathematical education in science and technology*, *50*(1), 3-24.	The use of recorded lecture videos (RLVs) in mathematics instruction continues to advance. Prior research at the post-secondary level has indicated a tendency for RLV use in mathematics to be negatively correlated with academic performance, although it is unclear whether this is because regular users are generally weaker mathematics students "or" because RLV use is somehow depressing student learning. Through the lens of "cognitive engagement," a quasi-experimental pre- and post-test design study was conducted to investigate the latter possibility. Cognitive engagement was operationalized using the "Revised Two-Factor Study Process Questionnaire" (R-SPQ-2F), which measures learning approaches on two major scales: surface and deep. In two mathematics courses at two universities, in Australia and the UK, participants were administered the questionnaire near the course start and finish. Overall findings were similar in both contexts: a reduction in live lecture attendance coupled with a dependence on RLVs was associated with an increase in surface approaches to learning. This study has important implications for future pedagogical development and adds to the sense of urgency regarding research into best practices using RLVs in mathematics.
123	Truhlar, A. M., Walter, M. T., & Williams, K. M. (2018). Student engagement with course content and	As higher education institutions in United States offer online courses to growing audiences, there is increasing desire to understand how best to

	peers in synchronous online discussions. *Online Learning*, *22*(4), 289-312.	engage students with both course content and their peers. This case study examines the effects of assigning chat roles and facilitating self- and group reflection on student--content and student--student interaction outcomes in four synchronous chats conducted in an online introductory-level sustainability course. We also considered what occurred within group reflections to inform how they are structured in the future. We found that assigning roles increased the proportion of critical student--student interactions. Self-reflections had no effect on either interaction type. Groups completing group reflections had a greater proportion of critical student--content interactions in the third chat and critical student--student interactions in the fourth chat than the groups that did not complete the group reflections. Based on our results, we plan to keep roles and group reflections going forward, and eliminate self-reflections. Furthermore, to increase the effectiveness of the group reflections, we propose some ideas to increase student ability to convert their ideas into change during subsequent chats.
124	Vayre, E., & Vonthron, A. M. (2017). Psychological engagement of students in distance and online learning: Effects of self-efficacy and psychosocial processes. *Journal of Educational Computing Research*, *55*(2), 197-218.	The aim of this study is to test a model of online learners' engagement, which integrates social support (from teachers, peers, and family members) and sense of community as direct and indirect factors, with academic self-efficacy playing a mediating role. Survey results based on a questionnaire administered to 255 students enrolled in an online university course confirm, but only partially, our hypothesized model. Path analysis revealed that social support provided by teachers was the only interindividual factor that influenced students' engagement. Moreover, the sense of community was also a significant direct predictor of online learners' engagement. Finally, self-efficacy functioned as a mediator only between the sense of community and engagement.
125	Vercellotti, M. L. (2018). Do interactive learning spaces increase student achievement? A comparison of classroom context. *Active Learning in Higher Education*, *19*(3), 197-210.	Research on interactive learning space classrooms has reported that instructors and students find them engaging, and engagement is expected to increase learning outcomes. Positive findings about interactive classrooms, though, are often confounded with active learning pedagogy since instructors who teach in interactive classrooms tend to also promote active learning pedagogy. More research is needed to tease apart learning gains from the instructional design, classroom context, and the related incorporation of technology. This study examined the relationship between

		learning gains and classroom context (traditional and interactive learning space) in a pretest/posttest design and reviewed student survey responses about learning experiences. Participants were enrolled in one of two sections of a course. Both groups were taught by the same instructor using active learning pedagogy with the same activities, materials, and assignments. The results showed that classroom context did not result in differences in students learning overall. Some findings pointing to subtle differences, however, indicate that the interactive classroom could have made the classroom instruction more effective and efficient.
126	Viswanathan, S., & Radhakrishnan, B. (2018). A Novel 'Game Design'Methodology for STEM Program. *International Journal of Game-Based Learning (IJGBL)*, *8*(4), 1-17.	A novel approach to teaching concepts using game design in the graduate sustainability and engineering management programs is illustrated. These student-built games tied to demonstrate the course learning outcomes (CLOs) were tested in a classroom environment. This pilot study's impact on student learning, motivation, creativity, engagement, innovation, team interactions, and instructor leadership, and its contribution towards the achievement of CLOs were assessed in multiple courses. The results from this pilot study involving students indicated that the game design, creation, and play is an effective and innovative pedagogical tool that could promote student engagement, motivation, critical thinking, and learning skills with minimal educational tools. In addition, this innovative teaching tool could help change the declining and waning interest in STEM+ programs at the graduate level.
127	Wdowik, S. (2014). Using a Synchronous Online Learning Environment to Promote and Enhance Transactional Engagement beyond the Classroom. *Campus-Wide Information Systems, 31*(4), 264-275.	Purpose: The purpose of this paper is to create a synchronous online learning community through the use of "Blackboard Collaborate!" to promote and enhance transactional engagement outside the classroom. Design/methodology/approach: This paper employs a quantitative and qualitative approach where data were sourced from a third year finance unit across one semester using a survey instrument. SPSS v20 was used to perform basic descriptive analysis. Findings: The study revealed that by providing an online learning community through the use of "Blackboard Collaborate!" significantly enhances transactional engagement beyond the classroom. In particular the use of "Blackboard Collaborate!" allowed the teacher to be more accessible, supportive, expect and support high standards and provide challenging activities that generated rich and meaningful

		interactions and promoted higher order thinking skills. Research limitations/implications: The positive results emanating from this study may encourage other educators and their institutions to adopt a synchronous online learning community to enhance student's engagement levels and increase the quality of student learning and their university experience. This study was conducted at only one university so it may not be feasible to form generalisations resulting from the findings. Originality/value: This study adds new insights towards the scarce amount of literature on engagement in a blended learning environment. In particular the study adds a student perspective to the student engagement literature and to what constitutes quality in higher education and/or improved student experience.
128	Willis, J., Davis, K., & Chaplin, S. (2013). Sociocultural Affordances of Online Peer Engagement. *Journal of Learning Design*, *6*(1), 34-45.	University learning increasingly includes online learning experiences embedded within teaching with the dual policy intentions of increasing flexibility and learner engagement. In this research project, three university lecturers from different teaching contexts selected technologies for online learning to enhance learner engagement by encouraging peer learning. A sociocultural view of learning was used to conceptualise the technological and social affordances that might enable student peer participation and engagement. The research explored the question: "What are the benefits and barriers experienced by students engaging in online peer collaboration?" Students reported benefits including a sense of belonging that enhanced motivation, and professional identity. This article also reports on some of the challenges for students and University academics when engaging in online learning communities. (Contains 2 tables and 2 figures.)
129	Witecki, G., & Nonnecke, B. (2015). Engagement in Digital Lecture Halls: A Study of Student Course Engagement and Mobile Device Use during Lecture. *Journal of Information Technology Education: Research, 14*, 73-90.	Universities have experienced increases in technology ownership and usage amongst students entering undergraduate programs. Almost all students report owning a mobile phone and many students view laptops and tablets as educational tools, though they also report using them for nonacademic activities during lectures. We explored the relationship between student course engagement and the use of smartphones, laptops, cell phones, and tablets during lecture. Undergraduate students responded to an online survey asking about both course engagement and mobile device habits. Results show that smartphone use was most strongly related to lowered course engagement and while laptop use was related to lowered engagement, it was

		to a lesser extent. In contrast, overall engagement of students using tablets or cell phones was not significantly different than those who did not.
130	Wood, A. K., Galloway, R. K., Donnelly, R., & Hardy, J. (2016). Characterizing interactive engagement activities in a flipped introductory physics class. *Physical Review Physics Education Research*, *12*(1), 010140.	Interactive engagement activities are increasingly common in undergraduate physics teaching. As research efforts move beyond simply showing that interactive engagement pedagogies work towards developing an understanding of "how" they lead to improved learning outcomes, a detailed analysis of the way in which these activities are used in practice is needed. Our aim in this paper is to present a characterization of the type and duration of interactions, as experienced by students, that took place during two introductory physics courses (1A and 1B) at a university in the United Kingdom. Through this work, a simple framework for analyzing lectures-- the framework for interactive learning in lectures (FILL), which focuses on student interactions (with the lecturer, with each other, and with the material) is proposed. The pedagogical approach is based on Peer Instruction (PI) and both courses are taught by the same lecturer.We find lecture activities can be categorized into three types: interactive (25%), vicarious interactive (20%) (involving questions to and from the lecturer), and noninteractive (55%). As expected, the majority of both interactive and vicarious interactive activities took place during PI. However, the way that interactive activities were used during non-PI sections of the lecture varied significantly between the two courses. Differences were also found in the average time spent on lecturer-student interactions (28% for 1A and 12% for 1B), although not on student-student interactions (12% and 12%) or on individual learning (10% and 7%). These results are explored in detail and the implications for future research are discussed.
131	Yang, T., Koszalka, T. A., & Lei, J. (2018). Exploring Asynchronous Online Discussions: Interactions, Facilitation, Levels of Thinking, and Engagement with Learning Resources. In *AERA Online Paper Repository* (pp. 1-14). American Educational Research Association.	This qualitative study explored asynchronous online discussions (AODs) in terms of: (1) whether students interacted effectively with each other, (2) how moderators facilitated discussions, (3) whether students achieved higher levels of thinking about discussion content, and (4) how students demonstrated engagement with provided learning resources. Results indicated that the level of thinking and the engagement with learning resources were low. However, moderators facilitated AODs differently in three aspects: follow-up, format, and time. The distinct features of one

		remarkable discussion case provided suggestions on how to develop other relevant studies and how to enhance the AOD activities.
132	Yates, A., Brindley-Richards, W., & Thistoll, T. (2014). Student Engagement in Distance-based Vocational Education. *Journal of Open Flexible and Distance Learning*, *18*(2), 29-43.	Students enrolled in distance education courses tend to have lower course completion rates than those who attend face-to-face classes (Simpson, 2013). This article reports on a collective case study undertaken at a vocational, distance education provider in New Zealand, whose course completion rates have risen over recent years to match those of similar face-to-face institutions. This research investigated institutional factors that have contributed towards this improvement, from the perspectives of the staff involved. Results show staff believe there are key enablers and barriers to student engagement and course completion, but the barriers are not insurmountable. The implication is that distance education providers can improve student engagement and completion rates through effective interventions.
133	Yilmaz, O. (2017). Learner centered classroom in science instruction: Providing feedback with technology integration. *International Journal of Research in Education and Science*, *3*(2), 604-613.	Learner centered term points out environments that attention to the learners brings to the educational setting. This term includes teaching practices: effort to uncover what learners think in a specific problem on hand, talking about their misconceptions and, giving them situations to readjust their ideas. In Learner centered classrooms, teachers assess different student for feedback and revision. The two major, summative and formative, assessment reveal individual students? progress continually. Teachers, in many classrooms, provide feedbacks to students are relatively rare. Feedback is most effective in learning when students have the opportunity to use it to readjust their thinking. Technology integration, a part of learner centered classroom, is support to providing feedback in effective way. This paper explores the design of learner centered classroom in relation to the interactive technology integration which is based on using mobile technology to provide effective feedback in learning environment. Higher education students used mobile interactive technology with teacher, one term, in misconception in science course. Qualitative research design was used in this research. Focus group interview method was used to get data collecting. The study findings show that mobile technology supports feedback effectively and promote student engagement in the classroom. [This paper was presented at the International Conference on Education in

		Mathematics, Science & Technology (ICEMST), May 19-22, 2016, Bodrum-TURKEY.]
134	Yousuf, B., & Conlan, O. (2017). Supporting student engagement through explorable visual narratives. *IEEE Transactions on Learning Technologies*, *11*(3), 307-320.	This paper introduces VisEN, a novel visual narrative framework that has been shown to facilitate, support, and enhance student engagement in an adaptive Online Learning Environment (OLE). VisEN provides explorable visual narratives personalized to students in order to support them in engaging with course content. The evaluation of VisEN showed that the explorable visual narratives encouraged the majority of 'improving engagement students', that completed the Information Management and Data Engineering module as part of their undergraduate degree, to engage with assigned activities, and subsequently these learners enhanced their engagement levels. Visualizations have been used in OLEs to support students by presenting student data. Information Visualization research has demonstrated the value of visual narratives in communicating a message, by highlighting facts and making the message more memorable. In addition, visual data exploration can support users in understanding the message. However, in OLEs, explorable visual narratives have not been used to date to support student engagement or to guide learners through a message that they could explore and understand. This paper evaluates the impact that explorable visual narratives had on student course engagement during two successive academic years.
135	Zanjani, N., Edwards, S., Nykvist, S., & Geva, S. (2017). The important elements of LMS design that affect user engagement with e-learning tools within LMSs in the higher education sector. *Australasian Journal of Educational Technology*, *33*(1), 19-31.	In recent years, universities have been under increased pressure to adopt e-learning practices for teaching and learning. In particular, the emphasis has been on learning management systems (LMSs) and associated collaboration tools to provide opportunities for sharing knowledge, building a community of learners, and supporting higher order learning and critical thinking through conversation and collaboration. Due to the greater level of data continuity, reliability, and privacy that LMSs can provide compared to the available free applications, LMSs are still the central platform for many universities to deliver e-learning. Therefore, it is vital to investigate the LMS structure requisites that affect user engagement. This paper focuses on the important LMS design factors that influence user engagement with e-learning tools within LMSs. Results were extracted from 74 interviews about Blackboard with students and lecturers within a major Australian

		university. A user-friendly structure, avoidance of too many tools and links, support for privacy and anonymous posting, and more customisable student-centred tools were identified as LMS design factors that affect user engagement.