Literature Review: Flexible Learning and Retention

This short review of the literature concerning flexible learning and retention is based on searches of the WSU Library databases and Google scholar for the terms 'retention' in addition to 'flexible learning', 'flipped learning', 'blended learning', or 'online learning'. A variety of terms reflecting 'flexible learning' exist, covering a wide range of practices. Although the concepts have a range of definitions (Kuiper, Carver, Posner, & Everson, 2015), here flexible learning is considered to be interchangeable with 'flipped classroom' (FC) learning, which reverses the typical lecture and homework elements of a course (Jenkins et al., 2017). 'Online learning' can refer to the purely online courses offered by institutions such as Open Universities, but these studies have been included as they also provide insights into flipped pedagogy.

According to a review by Aronson & Arfstrom (2013), the major motivations for universities to flip courses in order of priority are:

1. Improve students' critical thinking/professional skills
2. Increase student participation, engagement, and motivation
3. Improve students' team-based skills and peer-to-peer interaction
4. Customize/differentiate learning
5. Make students the centre of learning/encourage student ownership of learning
6. Improve faculty–student interaction
   Increase faculty freedom/enjoyment
   Improve learning outcomes
7. Deal with absences
   Encourage faculty collaboration
   Compensate for limited classroom space

There are mixed reports on the extent to which these outcomes are achieved. A small number of studies consider the student career in terms of retention in course (R. Sutton, 2014), persistence (S. C. Sutton & Nora, 2008), reasons for dropping out (Sorensen & Donovan, 2017) or fail/withdraw grades (Ryan & Reid, 2016). However, retention *per se* is typically a concern at the institution rather than course level. More studies examine elements of retention, such as engagement (Murillo-Zamorano, López Sánchez, & Godoy-Caballero, 2019), student performance (Ryan & Reid, 2016), student satisfaction (van Alten, Phielix, Janssen, & Kester, 2019) and the acquisition of knowledge or skills (Mason, Shuman, & Cook, 2013).

In summary, these findings generally suggest that flexible or flipped learning affects student learning and satisfaction positively if it is done well, recognising the particular challenges and opportunities of the online environment. Successful implementation of FCs requires a cultural shift and support for teaching staff (Brewer & Movahedazarhouligh, 2018; Stone, 2019). Instituted poorly, FCs are open to the accusation that the method is just 'self-teaching' (Talbert, 2014).

Literature Reviews

Several authors have reviewed the literature on flipped learning and drawn lessons and implications for their disciplines. Brewer & Movahedazarhouligh (2018) highlight the potential of flipped learning generally to 'provide dynamic, interactive learning environments where the educator guides students as they apply concepts and engage creatively in the subject matter' while cautioning that there remain 'understandable concerns about the time involved and fundamental shift in teaching style required'. These sentiments are echoed by a widely cited review by Estes, Ingram, & Liu (2014).

Some reviews have addressed FCs in specific disciplines. A review by Kerr (2015) of flipped learning in engineering courses found a general consensus that the method increased student satisfaction and performance relative to traditional teaching. Mason et al. (2013) also found improvements in

student scores in a study of mechanical engineering students. However, in a meta-analysis, Chen, Lui, & Martinelli (2017) concluded that the variable effect sizes in medical subjects 'suggested the lack of strong evidence for the effectiveness of FCs in promoting knowledge acquisition above and beyond the traditional learning methods.'

UPDATE

Subsequent to this review, Advance HE has funded an integrative literature review on **Flexible Learning within Higher Education (2016-2021)**[1]. The review is available on the Resources section of the FLEX Program of Research website. It is a valuable (current and comprehensive) resource to inform Flexible Learning research at Western. Summarising, it:

- Reports in-depth analysis of 105 Higher Education (HE) research articles published 2016-2021.
- Details research undertaken across the world, using quantitative, qualitative and mixed methods and includes a few conceptual articles.
- Identifies and summarises flexible learning trends, issues and impact, including specific impact and evidence compassing:
    - policy and/or practice with evidence of impact on student outcomes (student performance, progression, engagement, satisfaction, skill acquisition and/or self-confidence).
    - impact of emergent technologies
    - adapting and evaluating innovative teaching and assessment practices
    - workforce development and policy review
    - intersections with employment and employability
    - Enablers of flexible learning.

Experimental Studies

One approach to assessing the effectiveness of FCs for learning is the use of controlled trials whereby the outcomes of the same courses taught in traditional and FCs are compared. Ryan & Reid (2016) conducted such a trial with a class in general chemistry. They found the differences in examination results were only significant for the bottom third in terms of pre-test rank, of whom those in the flipped class performed better. In addition, the proportion of D and F grades as well as withdrawals was reduced by 56% among the 117 students in the flipped class.

A similar comparison comparing traditional and FC methods in an undergraduate mechanical engineering unit showed significantly improved test scores and reported satisfaction from students in the flipped mode (Mason et al., 2013). Interestingly, these students also reported spending less time on study than their counterparts in the traditional mode.

An alternative approach involving structural equation modelling (SEM) was adopted by Murillo-Zamorano, López Sánchez, & Godoy-Caballero (2019) in a study of economics students in Spain. They tested and validated the model shown in Figure 1. The FC proved to have positive effects on knowledge, skills and engagement, and (indirectly) on student satisfaction.

[1] https://www.advance-he.ac.uk/membership/member-benefits-2021-22/connect-benefit-series/student-success

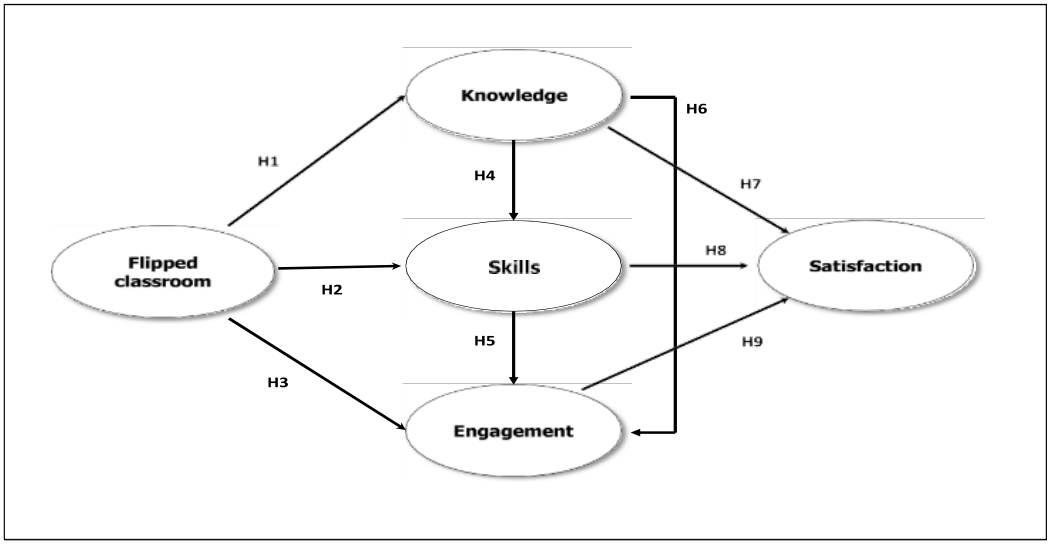

Figure 1. Theoretical framework and hypotheses. (Murillo-Zamorano et al., 2019)

Course / Unit Retention

As noted above, direct measures of course and unit retention are less common in the literature. Retention in purely online courses is generally lower than for face to face courses (Stone & Springer, 2019). However, retention in courses with FC teaching methods can produce more positive results, as a number of studies have shown (Heaton-Shrestha, May, & Burke, 2009; Lee & Choi, 2013; Ryan & Reid, 2016).

In an SEM study by Lee & Choi in Korea (2013), academic internal locus of control had a strong impact on retention, as did students' 'flow experience', which is the state of being completely involved in an activity. However, the effect of student factors on retention is mediated by their satisfaction and flow experience.

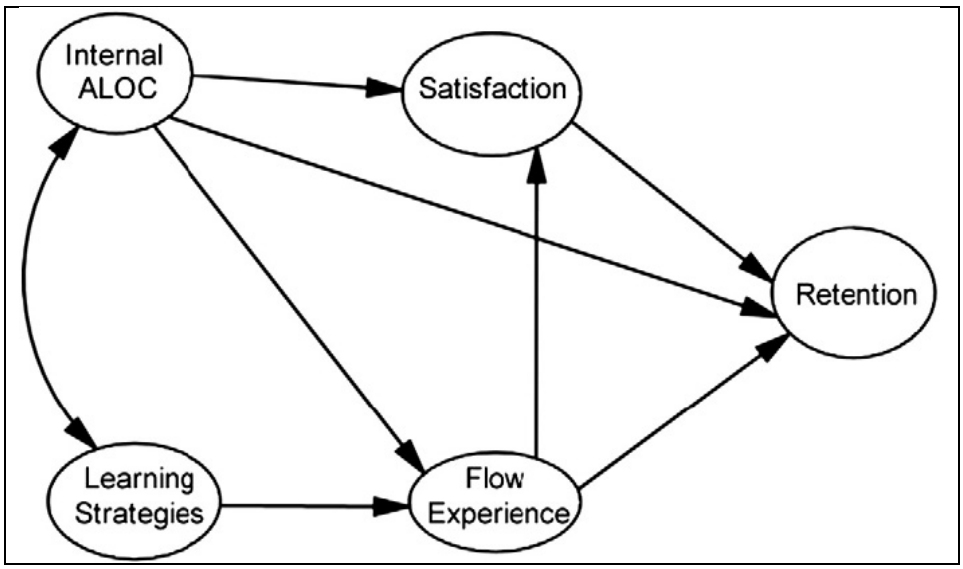

Figure 2. Lee & Choi's (2012) Model

Most studies reviewed show positive student reactions to flipped or flexible learning and greater student satisfaction in this mode than in classes taught in a traditional manner (Kerr, 2015; Mason et al., 2013; Murillo-Zamorano et al., 2019). For example, Mellefont & Fei (2016) found that students indicated that online pre-recorded lectures '1) assisted [students] in preparing for laboratory classes

independently and at their own pace; 2) enabled more class time to complete tasks, 3) enabled them to revisit and clarify confusing content; and 4) provided revision material'. Heaton-Shrestha, May, & Burke (2009) even note that students are more positive than staff about the 'virtual learning environment'. In addition, a US study of students at a 'mid-Atlantic historically Black college and university' found that the use of FC methods improved course grades over previous semesters by increasing the time students spent studying the material (Talley & Scherer, 2013).

However, it should be noted that studies are very heterogeneous in their methods and findings (van Alten et al., 2019).

Student Factors and Diversity

In addition to the instructional/course factors, student factors play a role in the success of FC methods. An Australian study by Lyons, Brock, Malone, Freihat, & White (2020) of course examinations and objective structured clinical examinations (OSCEs) results of pharmacy students found domestic (i.e., Australian) student designation, written English proficiency, and pre-class online activity completion to predict OSCE communication scores. Positive predictors of OSCE problem-solving were workshop attendance and low empathy, and examination results were correlated with ATAR, completing online activities prior to lectures, and high integrity.

In relation to equity students, Stone & Springer (2019) note that online education in Australia is generally beneficial for retention of low SES, Indigenous and regional students as well as those with disabilities as it reduces the need for travel, lets them stay in their local areas and allows them more flexibility in their use of time. These advantages would also apply to flexible learning and would allow students to remain at university who otherwise might drop out.

Recommendations for Flexible Learning

Overall, the picture that emerges from the literature is that flexible and online learning can improve outcomes and retention in courses, but only if the curriculum is delivered well. Stone (2019) notes that students in general are familiar with social media and commercial technology, so they are quick to spot poor design. Moreover, implementing FCs is not simply a technical problem. Curriculum design should follow design principles such as those outlined by Nelson, Kift, & Clarke (2012).

In a study of postgraduate students, Sutton (2014) found that key factors were interactions with the instructor and meaningful feedback, as well as the 'opportunities to be a valued member of a learning community that is flexible and asynchronous with vast and flexible learning resources, and authentic assessments.

Recommendations (Stone, 2019) are:

1. Adopt a strategic whole-of-institution approach.
2. Intervene early.
3. Remember the vital role of 'teacher presence'.
4. Design for online.
5. Contact and connect along the student journey.
6. Use learning analytics.
7. Collaborate to deliver support at point of need.

REFERENCES

Aronson, N., & Arfstrom, K. M. (2013). Flipped learning in higher education. Retrieved from http://www.arfstrom.net/uploads/3/1/8/1/31819993/higheredwhitepaper_final.pdf

Brewer, R., & Movahedazarhouligh, S. (2018). Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning, 34*(4), 409-416. doi:10.1111/jcal.12250

Chen, F., Lui, A. M., & Martinelli, S. M. (2017). A systematic review of the effectiveness of flipped classrooms in medical education. *Medical Education, 51*(6), 585-597. doi:10.1111/medu.13272

Estes, M. D., Ingram, R., & Liu, J. C. (2014). A review of flipped classroom research, practice, and technologies. *International HETL Review, 4*(7). Retrieved from https://www.hetl.org/feature-articles/a-review-of-flipped-classroom-research-practice-and-technologies

Heaton-Shrestha, C., May, S., & Burke, L. (2009). Student retention in higher education: what role for virtual learning environments? *Journal of Further and Higher Education, 33*(1), 83-92. doi:10.1080/03098770802645189

Jenkins, M., Bokosmaty, R., Brown, M., Browne, C., Gao, Q., Hanson, J., & Kupatadze, K. (2017). Enhancing the design and analysis of flipped learning strategies. *Teaching & Learning Inquiry, 5*(1), 65-77. doi:10.20343/teachlearninqu.5.1.7

Kerr, B. (2015, 20-24 Sept. 2015). *The flipped classroom in engineering education: A survey of the research.* Paper presented at the 2015 International Conference on Interactive Collaborative Learning (ICL).

Kuiper, S. R., Carver, R. H., Posner, M. A., & Everson, M. G. (2015). Four Perspectives on Flipping the Statistics Classroom: Changing Pedagogy to Enhance Student-Centered Learning. *PRIMUS : problems, resources, and issues in mathematics undergraduate studies, 25*(8), 655-682. doi:10.1080/10511970.2015.1045573

Lee, Y., & Choi, J. (2013). A structural equation model of predictors of online learning retention. *Internet & Higher Education, 16*, 36-42. doi:10.1016/j.iheduc.2012.01.005

Lyons, K. M. P. P., Brock, T. P. E. M., Malone, D. T. P. B., Freihat, L. P., & White, P. J. P. (2020). Predictors of Pharmacy Student Performance on Written and Clinical Examinations in a Flipped Classroom Curriculum. *American Journal of Pharmaceutical Education, 84*(12), 1627-1636.

Mason, G. S., Shuman, T. R., & Cook, K. E. (2013). Comparing the Effectiveness of an Inverted Classroom to a Traditional Classroom in an Upper-Division Engineering Course. *IEEE Transactions on Education, 56*(4), 430-435. doi:10.1109/TE.2013.2249066

Mellefont, L. A., & Fei, J. (2016). Student Perceptions of 'Flipped' Microbiology Laboratory Classes. *International Journal of Innovation in Science and Mathematics Education, 24*(1).

Murillo-Zamorano, L. R., López Sánchez, J. Á., & Godoy-Caballero, A. L. (2019). How the flipped classroom affects knowledge, skills, and engagement in higher education: Effects on students' satisfaction. *Computer Education, 141*, 103608. doi:10.1016/j.compedu.2019.103608

Nelson, K. J., Kift, S., & Clarke, J. A. (2012). *A transition pedagogy for student engagement and first-year learning, success and retention*. United Kingdom: Libri Publishing.

Ryan, M. D., & Reid, S. A. (2016). Impact of the flipped classroom on student performance and retention: A parallel controlled study in general chemistry. *Journal of Chemical Education, 93*(1), 13-23. doi:10.1021/acs.jchemed.5b00717

Sorensen, C., & Donovan, J. (2017). An Examination of Factors That Impact the Retention of Online Students at a For-profit University. *Online Learning, 21*(3), 206-221. doi:10.24059/olj.v21i3.935

Stone, C. (2019). Online learning in Australian higher education: Opportunities, challenges and transformations. *Student Success, 10*, 1-11. doi:10.5204/ssj.v10i2.1299

Stone, C., & Springer, M. (2019). Interactivity, connectedness and 'teacher-presence' : Engaging and retaining students online. *Australian Journal of Adult Learning, 59*(2), 146-169.

Sutton, R. (2014). Unlearning the Past: New Foundations for Online Student Retention. *Journal of Educators Online, 11*(3), 1-30. doi:10.9743/JEO.2014.3.5

Sutton, S. C., & Nora, A. (2008). An exploration of college persistence for students enrolled in web-enhanced courses: A multivariate analytic approach. *Journal of College Student Retention: Research, Theory and Practice, 10*(1), 21-37. doi:10.2190/CS.10.1.c

Talbert, R. (2014). Flipped learning skepticism: Is flipped learning just self-teaching? Retrieved from https://www.chronicle.com/blognetwork/castingoutnines/2014/04/28/flipped-learning-skepticism-is-flipped-learning-just-self-teaching/

Talley, C., P. , & Scherer, S. (2013). The enhanced flipped classroom: increasing academic performance with student-recorded lectures and practice testing in a "flipped" STEM course. *The Journal of Negro education, 82*(3), 339-347. doi:10.7709/jnegroeducation.82.3.0339

van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. *Educational Research Review, 28*, 100281. doi:https://doi.org/10.1016/j.edurev.2019.05.003

LITERATURE REVIEW SUMMARY TABLE

FLEXIBLE LEARNING AND RETENTION

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
Alsancak Sirakaya & Özdemir (2018) *Malaysian Online Journal of Educational Technology*	Turkey: 66 students in two classes of a unit on scientific research methods.	To examine effects of flipped learning on academic achievement, self-directed learning readiness, motivation and (information) retention	Experiment comparing flipped classroom and 'classic blended learning'	Achievement test, Self-directed learning readiness scale Motivation scale	Significantly better academic achievement, motivation and retention in flipped class, but no difference in self-directed learning readiness	Small sample, and 'retention' refers to information retention (test scores)
Aronson & Arfstrom (2013) www.flippedlearning.org Pearson	Examples of flipped classrooms from the US, Australia, and Canada	Introduction to an example of FCs	Professional journal article / brief case studies	Pass rate, student achievement, attendance, engagement, student ratings, 'concept ratings' to measure gains in understanding pre/post-test.	Gains are reported on all measures in flipped classrooms. A table shows the top motivations for HEIs adopting FCs reported in the literature. Critical thinking skills are no. 1, followed by 'Increase student participation, engagement, and motivation'.	Not a peer-reviewed journal but short examples and possibly useful links.
Ashby (2004)* *Open Learning*	Improving retention in the Open University (UK).	Outlining definition, measurement and interpretation of retention	Review of British statistics and Reasons for attrition from OU	Recommends various university measures to boost retention	Overall slight increase in retention rates for new undergraduates and a slight fall for continuing undergraduates.	Online-only, not FC exactly. Possibly limited application to WSU
Brewer & Movahedazarhouligh (2018) *Journal of Computer-Assisted Learning*	Literature review of flipped learning	To report the impact and issues of flipped learning from students' and instructors' viewpoints and review of the efficacy and quality of this model.	Review article	Reports various studies—generally positive effects of flipped Learning on student engagement, critical thinking and satisfaction.	Flipped learning improves student outcomes, but requires cultural shift and support for teaching staff.	A useful review and history of FCs and methods.
Carroll, Ng, & Birch (2009) *Open Learning*	Postgraduate business students	To investigate retention and progression in distance education	Exploratory case study	Semi-structured in-depth interviews with	Identified a range of situational, institutional and dispositional factors related to	Distance education; researcher is from USQ

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
	Australian distance education university			PG business students: active, delayed and exited students.	decision to continue or leave the course.	
Chen, Lui, & Martinelli (2017) *Medical Education*	Review of effectiveness of FCs in medical education.	To examine the scope and quality of studies on the FC teaching approach in medical education and to assess the effects of FCs on medical learning.	Systematic review and synthesis of 46 studies of FCs in medical courses.	Perceptions of FCs, changes in knowledge and skill acquisition.	The flipped approach is perceived positively by students, but the knowledge/skill eff ect sizes ranged from d = –0.27 to 1.21, with a median of 0.08, but the Cis contained zero	Rigorous methodology; limited to medical context.
Deslauriers, Schelew, & Wieman (2011) *Science*	Comparison of two classes in introductory physics.	To compare learning in a 3-hour traditional class compared with 'research-based instruction' to use the time in class for "thinking scientifically".	Experiment	Attendance Engagement Exam & test scores	Improved outcomes in terms of engagement (measured by trained observers), attendance and test scores.	Similar to flipped learning, but not classified as such. Cited in Brewer & Movahedazarhouli gh
Estes, Ingram, & Liu (2014) International Higher Education Teaching and Learning Association	Review of research literature	To maximize the learning experience, make data-driven decisions, and improve learner outcomes	Literature review	NA	Proposes strategies for flipping – pre-class, in class, and post-class.	Researchers from James Madison University. Some useful references.
Greenland & Moore (2014) *Open Praxis*	Swinburne University's open access online learning 2008–12	To examine enrolment and retention in online education	Data study	Records of SUT unit enrolment and withdrawal statistics, and associated unit results reports.	Withdrawal declined by level: 20.6% for level one units, 13.3% for level two, and 11.4% for level three. The reasons for withdrawal in order were work, personal reasons, technology problems, competence in online learning, and poor study skills.	Dated, and online learning rather than flipped, but the methods could be replicated.
Heaton-Shrestha, May, & Burke (2009)	UK (Kingston University)	To examine how 'virtual learning	Qualitative study	Structured interviews with	Students were more positive than staff about VLEs.	

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
Journal of Further and Higher Education		environments' influence first-year retention.		23 academic staff and 43 students	Blackboard enhanced their sense of community, and sense of ownership of their learning, and motivation	
Jenkins et al. (2017) *Teaching & Learning Inquiry*	Theoretical, researchers from several countries.	To propose pedagogical strategies for flipped learning, and the Flipped Learning Matrix	Theoretical paper based on literature	NA - Proposal	Identifies four broad categories of flipped learning: identifying, pursuing, producing and authoring	Interesting in respect to 'doing it well, but not directly measuring retention.
Kerr (2015)	Literature review of flipped classroom studies for engineering students	To identify empirical studies that have investigated the impact of using a flipped classroom model in undergraduate engineering education	Literature review of 24 studies	Student perceptions Student performance	'Most studies reported high student satisfaction and increased performance in a flipped classroom environment'.	Some encouraging findings for technical subjects.
Kuiper, Carver, Posner, & Everson (2015) *Primus*	Teaching statistics	To discuss proper communication with students and the aspects that should be flipped.	Case studies	Examples of materials from four faculty members at different institutions	Recommendations and examples of flipped classroom activities in mathematics.	Possibly useful for teachers – provides suggestions for flipped learning.
Lee & Choi (2013) *Internet and Higher Education*	KNOU - distance education institute in South Korea, students majoring in education	To construct an SEM of retention of online students	Data model (structural equation model)	Student survey	Academic locus of control Extracts from various psychometric scales: Use of learning strategies Flow experience Student satisfaction Retention (measured as 'will to continue')	Retention is measured as student-reported will to continue.
Lyons, Brock, Malone, Freihat, & White (2020)	One cohort of a five-year combined Bachelor and Master of Pharmacy	To examine the effects of student demographics, prior academic performance, course	Course, learning management system, and institutional databases	ATAR, Diagnostic English Language Assessment	Regressions with course performance as the Dependent variable.	Contribution from Monash University Does not compare students with

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
American Journal of Pharmaceutical Education	degree program in flipped classroom teaching at one institution 159 Students	engagement, and time management on course examinations and objective structured clinical examinations (OSCEs).		(DELA) writing test, and situational judgment tests (SJTs). Workshop attendance (Moodle) Completion of pre-class tests University data	OSCE performance predicted by domestic designation, English proficiency, pre-class online activity completion. Low empathy, High integrity	traditional modes of delivery.
Mason, Shuman, & Cook (2013) *IEEE Transactions on Education*	Mechanical Engineering at Seattle University, over two years – year 1 was a traditional class and year 2 'inverted'	To quantify how an IC affects content coverage To evaluate IC effect on student understanding of course material To assess student perceptions of IC	Experiment comparing 'inverted' and traditional formats	Content coverage, Quiz and exam performance Student perceptions of teaching, learning, and the inverted classroom format	1) Instructor covered more material; 2) Students in FC did better on quiz and exam questions and on open-ended design problems 3) Students initially struggled but adapted quickly found the FC satisfactory and effective.	Rather small sample – 20 students per year.
Mellefont & Fei (2016) *International Journal of Innovation in Science and Mathematics Education*	96 students in second year, undergraduate microbiology laboratory class at an Australian University	To investigate the utility of flipped classrooms in a University undergraduate microbiology laboratory	Experiment – some lecture blocks selected for flipping.	Online questionnaire survey: A. Student access B. Perceived benefits C. Perceived utility D. Open ended question	Students' responses were positive, and their understanding of material enhanced.	Australian study – student responses, no other measures.
Mingorance Estrada, Granda Vera, Rojas Ruiz, & Alemany Arrebola (2019)	555 early learning students in Spain	To assess the impact of FC methods on academic performance.	Quasi-experimental design with non-equivalent groups	Academic performance and participation	Improved grades in comparison to the traditional methodology. Increased learning motivation, class attendance and participation, interaction among students and greater commitment.	Large sample and apparently rigorous methodology.

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
Muir, Douglas, & Trimble (2020) *Journal of University Teaching & Learning Practice*	Australian regional university (UOW), online education Study 1: ninety pre-service teachers Study 2: 267 first-year Health Science students	Design-based research to evaluate the impact of facilitation strategies on teaching maths and human biology.	Two case studies, assessing Instructor presence, instructor connection, engagement and learning	Data were taken from 'eVALUate, unsolicited communications from students, and participation in online discussion boards using MyLO metrics'	Frequent communication with students, instructor accessibility and provision of prompt feedback promoted engagement	Australian context
Muljana & Luo (2019) *Journal of Information* *Technology Education: Research*	Systematic literature review	Researchers from Old Dominion University	Systematic literature review	40 studies published between 2010 and 2018	Important factors are Institutional support, Program level Promotion of a sense of belonging, Facilitation of learning, Course design, Student behavioural characteristics Demographic variables Other personal factors	Long list of recommended strategies
Murillo-Zamorano, López Sánchez, & Godoy-Caballero (2019) *Computer Education*	160 students enrolled in the Macroeconomics module in a Spanish business school	To present a successful flipped classroom proposal in higher education to better understand its influence in terms of knowledge, skills and engagement	Structural equation model based on survey responses and class data	Develops a scale to measure 'degree of flipped classroom presence' Knowledge, skills, engagement and students' satisfaction (student questionnaire)	The effect of flipped classrooms on student satisfaction is fully mediated by Knowledge, skills, and engagement	'Flipped classroom has positive effects on students' knowledge, skills, and engagement'
Polat & Karabatak (2021) *Learning Environments Research*	94 education students in Turkey	To assess the effect of the flipped classroom model on students' academic achievement, academic	Experimental design: one flipped classroom group, and two control groups with traditional	Academic achievement, academic satisfaction, and general belongingness	Outcomes were significantly improved in the flipped classroom group	Small sample in Turkey so possibly limited applicability.

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
		satisfaction, and general belongingness	classroom and distance education			
Rose & Moore (2019) *Online Journal of Distance Learning Administration*	Survey of 84 students enrolled in online courses (Norfolk State University)	To ask students 'What can the university do to help you to remain enrolled in online courses?'	Convenience sample and qualitative survey	Survey, with an open-ended question	Identified twenty-four themes with six meta-themes. 1. Student preparation 2. Learner support services 3. Faculty accountability 4. Faculty professional development 5. Course quality and design 6. Well-structured support systems	Possibly useful starting point for a survey and recommendations, but based on a small sample. Online learning
Ryan & Reid (2016)* *Journal of Chemical Education*	US study of level 2 chemistry students	To assess the impact of flipped classroom teaching on student performance and retention	Experiment (flipped vs. traditional classes taught by same instructor)	Student Performance (Exam scores) Retention (% Ds, Fs, withdrawals)	Exam scores only significantly different for bottom third scorers in pretest. Significant reduction in DFW grades in flipped mode	Interesting study, direct measure of retention.
Sarkar, Ford, & Manzo* (2020) *Journal of Education for Business*	Finance, statistics, accounting and microcomputer applications courses in the business department of a US community college. 200 students in FCs, 200 in TCs.	To investigate the effectiveness of a flipped class	'Quasi-experimental design model with a nonrandomized group of participants'	Academic performance (exams and grades), course content coverage, retention of students in courses (student enrolment and course completion), and student survey	Improvement in grades in all four FCs Positive student perceptions Content coverage was the same or better in 3 of 4 FCs, but a statistics tutor had to repeat flipped material in class. Highest retention was in 'hybrid' (partially online) FCs	Interesting, but the use of hybrid vs. face-to-face flipped methodology is not explained clearly in the methods.

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
Sorensen & Donovan* (2017) *Online Learning*	396 former undergraduate students of education who dropped out of online courses without providing a specific reason	To provide insight into why students decide to drop out of online programs	Non-experimental mixed methods.	Data from university databases, online survey, interviews, classroom walk-throughs	Students drop out because of: • Lack of support • students may misjudge their ability to balance multiple priorities or manage time; • May not drop out because they struggle academically; • Poor academic performance causing dropout occurs earlier in a • There may be a combination of factors	'Classroom walk-throughs' seem to consist of class observations. Online courses rather than flexible
Stone (2019) *Student Success*	Off-campus online study	To compare student and staff perspectives on ways to improve outcomes in online learning	Qualitative: Reports on two Australian research projects on the online student experience and one of academic and professional staff	Surveys and interviews	Recommendations for online learning, 1. Strategic whole-of-institution Approach 2. Intervene early 3. The vital role of 'teacher-presence' 4. Design for online 5. Contact and connect along the student journey 6. The role of learning analytics 7. Collaboration to deliver support at point of need	Some useful recommendations in an Australian context, but refers to online rather than strictly flexible learning.
Stone & Springer (2019)	Study of staff attitudes at 16 Australian universities Trial of changes to a ICT Project Management unit	To ask practitioners in online education about ways to most effectively engage, teach and support online students	Qualitative With pre-and post-changes in student feedback on a unit.	Interviews with 151 members of staff in 16 universities	Introduction of various changes—online quizzes, answering emails promptly, generating targeted messages for struggling students, and using closed captions on videos—led to significantly better	Useful recommendations, but for online learning.

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
					student evaluations.	
R. Sutton* (2014) *Journal of Educators Online*	Doctoral students (US)	To share lessons learned regarding factors that significantly increased student online course completion rates at one online for-profit university: strategic factors and assessment strategies	Review of literature and courses at universities	'Development design research' with course reviews and pre-post change data. Reviewing assessment data, advisor–advisee relationships, reflective writing and analytical writing assessments	A 39% increase in retention of first year doctoral candidates, from a low of 39% in 2011 to 75% in 2012.	
S. C. Sutton & Nora* (2008) *Journal of College Student Retention: Research, Theory and Practice*	Survey responses from 579 full-time or part-time undergraduate Students in university in Texas	To examine 'the academic and social engagement of students in Web-enhanced courses in distance education programs and the collective impact of cognitive, non-cognitive, and technologyrelated variables on student performance and withdrawal decisions'.	Longitudinal study using survey and institutional data to test a theoretical quantitative model of student persistence among students in Web-enhanced courses.	Student survey (Environmental Pull Factors, Social Experiences, Academic Integration, and Institutional/Goal Commitments) and institutional data (for persistence)	Predictors of student persistence (regression: Ethnicity (International Student versus White Students)*** Loans* Grants** Goal Commitment** Satisfaction w/Academic Experience* Course Fit** Cumulative GPA*** Intent to Persist*** Institutional Commitment*	Interesting but somewhat dated study, emphasising the importance of in-class experience for retention.
Talley & Scherer (2013) *Journal of Negro Education*	79 undergraduate psychology students in a historically Black college in the US	To encourage the use of more effective leaning techniques by students	Two flipped learning techniques — self-explanation and practice testing—were introduced to a psychology course.	Student unit grades (in percentage points)	The unit showed significantly improved grades over the previous semester before the introduction of the learning techniques.	

Paper	Study context	Aims / purpose	Methodology	Measures	Results	Comments
van Alten, Phielix, Janssen, & Kester (2019) *Educational Research Review*	Meta-analysis of 114 studies of flipped classrooms	To provide a statistical synthesis of current research on effects of flipped classrooms.	Meta-analysis comparing flipped and non-flipped classrooms in secondary and postsecondary education	Learning outcomes and student satisfaction	Small improvement in learning outcomes, but no effect on student satisfaction. There is considerable heterogeneity in the studies.	Does not mention retention.

VERSION CONTROL
This document was originally prepared by Colin Clark, Learning Futures, for the Vice Chancellor's Transition and Retention Taskforce, May 2021. Table 1. Literature Review Summary table, also prepared by Colin Clark has been added.