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Early adopters versus the majority: Characteristics and implications for academic development and institutional change

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ABSTRACT

The concept of early adopters versus mainstream majority has become common parlance when considering the uptake of technology-enhanced learning and teaching (TELT) in higher education, and relates to the readiness with which individuals adopt new technologies. This study used a questionnaire to explore the views and experiences of staff at one research-led institution within one of four colleges, to determine whether there were differences between the characteristics and digital academic practices of teachers, based on their self-identification as one of five types of technology adopters (innovators, early adopters, early majority, late majority and laggards). Subsequently, two focus groups allowed comparisons between early adopters and early majority staff.

The questionnaire found differences between the groups in relation to using a VLE to foster deep thinking through discussion, teachers' digital practices and attributes, previous engagement with developmental TELT opportunities, perceived level of support from management, and perceived usefulness of continued professional development (CPD) opportunities. Focus groups revealed qualitative differences in terms of the amount of time participants invested in learning new technologies, sources of TELT support, preference for different types of academic development, and how they engaged with exemplars in their own or other disciplines.

In addition to recommendations for different types of academic development for different groups, the study highlighted the importance of early adopters in leading digital practice. Institutions need to recognise and support the unique contribution made by early adopters. They contribute to the resilience, agility and digital capabilities of an institution in responding to rapid changes, such as the Covid19 pandemic, in terms of supporting and leading other staff, and prompting the institution to expand its digital education infrastructure.

Keywords: Early adopters, technology-enhanced learning and teaching, teaching innovation, academic development, digital capabilities

Introduction

The term 'early adopter' has become common parlance in discussions around engagement in technology-enhanced learning and teaching (TELT) in higher education e.g. (Armstrong, 2019; Bennett, 2014; Hixon, Buckenmeyer, Barczyk, Feldman, & Zamojski, 2012; Jacobsen, 2000), and was introduced in the context of Rogers' (2003) work on the diffusion of innovations. This resulted in a conceptual curve indicating that innovators who develop new products constitute 2.5% of the population. The following 13.5% represent early adopters, among the first to adopt an innovation, followed by the early (34%) and late (34%) majority. 'Laggards' (16%) represent the last people to adopt the innovation. The late majority and laggards tend to be referred to as the 'reluctant majority'. The categories mirror Slinn's (2010) identification of 'technology enthusiasts', 'visionaries', 'pragmatists', 'conservatives', and 'sceptics' (cited in Fresen, 2011). Early adopters or visionaries are the 'usual suspects' identified by Smith and Oliver (2000) who typically act as champions of TELT innovation in further and higher education, and who help drive the digital capability of the institution.

The importance of early adopters in helping institutions to be agile and resilient is especially important in current pandemic circumstances, as institutions have had to undertake the pivot online on an unprecedented scale (Lockee, 2021). Therefore, this study examines the characteristics of early adopters versus other technology users, and the preferred methods of continued professional development (CPD) for all types, with an ultimate aim to enhance the digital capability of a higher education institution (HEI). For the purposes of this study, early adoption of TELT is assumed to be reflective of innovative teaching.

Novotn (2002) defined an innovative teacher as "one who implements changes to [their] own job". Lunde and Wilhite (1996, p.156) defined teaching innovation as "a construct, comprised of a cluster of qualities including effective interaction with learners, openness to change, persistence, reflective practice, specificity of approach, and discipline-embedded pedagogy". Zhu, Wang, Cai and Engels (2013) identified four competencies associated with teaching innovation: a willingness to learn and practice innovative

teaching, communication and cooperation with students and colleagues, innovative pedagogy to guide students' learning, and knowledge of how to incorporate technology to promote critical thinking and deepen student understanding. Clearly, teaching innovation is multi-faceted and associated with personal teacher characteristics.

Studies reveal self-efficacy to be a key characteristic of innovative teachers; high self-efficacy in technology use is associated with constructivist pedagogy and increased use of technology (Hsu, 2016). Self-efficacy is also related to harnessing technology in pedagogically effective ways by Ertmer and Ottenbreit-Leftwich (2010), is highlighted in a review of teaching innovation by Thurlings, Evers and Vermeulen (2015) and is linked with innovative teaching by Klaeijsen, Vermeulen and Martens (2017).

Risk-taking versus conservativism is another aspect associated with teaching innovation; comparing early adopters versus mainstream majority teachers, Wilson and Stacey (2004, citing Geoghan (1995)) noted early adopters are risk-takers engaging in multidisciplinary interaction while the majority were more conservative, operating within their own discipline. Risk-taking was also represented in a measure of teacher innovativeness produced by McGeown (1980) and is highlighted by Lunde and Wilhite (1996).

Teachers' pedagogical beliefs also influence their use of technologies; student-centred approaches underpin student-centred (collaborative) practice (Prestridge, 2017) and are an important condition for teaching innovation (Thurlings et al., 2015). Approaches to e-teaching range from teacher-centred information focused approaches to an emphasis on student-centred communication and collaboration (González, 2012). Ellis et al. (2009) demonstrated similar outcomes in that teachers' conceptions of learning technologies influence how teachers design blended courses.

Lack of confidence in using technology is an impediment to technology adoption (Al-Senaidi, Lin, & Poirot, 2009). Early adopters are more confident at using technology in learning and teaching and demonstrate greater digital literacy (Jacobsen, 2000). Confidence is reflected in the framework for faculty digital practitionership created by Bennett (2014), based on Sharpe, Beetham and Freitas' (2010) tiered model of student digital literacies, comprising access, skills, practices and attributes.

To develop confidence and digital practice, staff need access to professional development opportunities. Teachers in higher education learn through doing/experimenting, interacting with students and colleagues, reading, and thinking/reflecting (van Eekelen, Boshuizen, & Vermunt, 2005). In terms of taking advantage of opportunities for teaching innovation, faculty who have received teaching awards demonstrate more engagement in teaching innovation (Lunde & Wilhite, 1996).

Teachers' ability to innovate can be influenced by external influencing factors. Barriers include inadequate infrastructure or equipment, lack of recognition or reward, lack of vision or institutional support from management, workload/lack of time and even students' attitude towards learning technology (Al-Senaidi et al., 2009; Fresen, 2011). Innovative teachers demonstrate more persistence in the face of adversity (Lunde & Wilhite, 1996). McGeown (1980) noted the influence of a school's organisational climate and its flexibility and support for change in this regard.

Aims and research questions

This study sought to define teaching innovation in the context of TELT, to identify the intrinsic characteristics of innovators and early adopters (hereon in referred to as innovator-adopters) versus the early and late majority (the majority), and to determine whether the groups were influenced to different degrees by external factors. It also explores what methods of CPD best support the different groups. Specific research questions (RQs) were:

1. How do teachers in higher education construe the concept of teaching innovation?
2. What intrinsic characteristics are associated with innovator-adopters versus the majority?
3. What extrinsic factors influence teachers' engagement in teaching innovation and TELT?
4. What methods of academic development may be used to support all teachers in higher education?

It is anticipated that innovator-adopters would demonstrate higher self-efficacy and greater risk-taking, and would demonstrate conceptions of e-learning at a higher level. It is also hypothesised that innovative-adopters would exhibit higher levels of digital practitionership, engage more with developmental TELT opportunities and CPD and would perceive fewer barriers to TELT innovation compared to the majority.

Methods

Context

The study was conducted in 2017-18 with academic staff in the College of Science and Engineering, one of four colleges at the University of Glasgow (UofG). This represented a suitable convenience sample. Without assuming generalisability, it was anticipated that findings from the study could be considered transferable to other HEIs with a similar size and focus.

Research design

The study was epistemologically interpretivist and ontologically constructivist as the research sought to capture the self-reported perceptions and experiences of participants (Cousin, 2009). A sequential, explanatory mixed methods case study approach was undertaken (Jones, Torres, & Arminio, 2006). An online questionnaire was administered to college staff, followed by focus groups to glean further insight. No incentives were offered, and participants were reassured that participation was voluntary and would not influence the relationship with the researchers. The study was approved by the college ethics committee (#300170159).

Questionnaire

The questionnaire was piloted with five colleagues in Academic and Digital Development, after which demographic questions (for example, gender) and other questions (for example, approaches to teaching) were omitted either because their inclusion was not supported by the literature review or for brevity. The study was subsequently advertised to all college staff through appropriate email channels, endorsed by senior college management to encourage participation. The questionnaire was anonymous, except for email addresses regarding interest in a follow up focus group. Identifying information was removed before analysis.

The questionnaire invited participants to self-identify as one of Rogers' (2003) five categories and to provide an explanation. Items were selected and adapted from Emmer and Hickman's (1991) teacher efficacy questionnaire (personal teacher efficacy and classroom management subscales). Informed by the study by Ee, Seng and Kwang (2007), items based on risk-taking versus conservativism were adapted from the Kirton Adaptation-Innovation Inventory (Bobic, Davis, & Cunningham, 1999). Items indicating the use of e-learning were replicated from González (2012). Digital practitionership items were derived from Bennett (2014). Items on previous engagement with teaching innovation opportunities were informed by the authors' expertise. CPD methods were informed by van Eekelen et al. (2005) and the authors' experiences. Contextual factors were informed by the literature review (Al-Senaidi et al., 2009; Brown, 2016; Fresen, 2011; Hsu, 2016; Mumtaz, 2000).

The survey was hosted on the Online Surveys platform and comprised five-point Likert scale items, categorical questions, and open text questions. Numerical data were analysed using SPSS in terms of frequency, before appropriate between-group comparisons (Kruskal-Wallis ANOVA for Likert scale data, and Chi-Square for categorical data). Given the small number of self-professed innovators, these were grouped with early adopters for the purposes of statistical analysis (I/EA) and their data compared with early majority (EM) and late majority (LM) respondents. Open text responses were categorised inductively (Thomas, 2006).

Focus groups

Individuals who had agreed in the survey to be contacted were invited to participate in a one-hour in-person focus group; these included one for early adopters and another for early majority staff. The focus groups explored:

- Understanding of the term 'teaching innovation'
- Enablers and barriers to TELT teaching innovation
- Most useful methods of CPD
- How the institution could better support staff to innovate

The focus groups were transcribed. A general inductive approach (Thomas, 2006) was employed, reading and re-reading the transcripts, and hand-coding segments of text deemed relevant in the context of the survey findings and literature review. To enhance trustworthiness, the coded transcripts were sent to participants for validation (Ryan, Coughlan, & Cronin, 2007). Quotes are included in the results for credibility.

Results

Seventy responses represent an 18% response rate, based on HR data which suggested there were 380 teaching staff in the college. Self-professed categories included 4% innovators, 23% early adopters, 49% early majority, 24% late majority. No respondents considered themselves to be laggards, which could indicate a possible response bias. One school contributed 35% of responses compared to 14-19% for the six other schools. In terms of job families, respondents included 3% teaching assistants, 28% Learning, Teaching and Scholarship staff, 66% Research & Teaching staff, and 4% 'other'. The breakdown of frequencies across the five categories is shown in relation to number of years' teaching and job families (Table 1). There were four participants in the early adopter focus group and five participants in the early majority focus group.

Table 1 Demographic breakdown of the five self-professed categories

	Innovator	Early adopter	Early majority	Late majority	Laggard
Average years' teaching (minimum-maximum)	13 (5-20)	9 (2-22)	13 (1-39)	18 (1-40)	N/A
% LTS vs. R&T staff (excluding other roles)	33% / 67%	50% / 44%	21% / 74%	18% / 71%	N/A

Data from the questionnaire are represented in Tables 2-8 showing the group comparisons. Frequency data are indicated by appropriate percentage shading. Significant values were considered where $p<0.05$. The dot indicates the median; where there are two dots, the median is between the two.

Definitions of teaching innovation

Collectively across the groups, participants identified teaching innovation with new technologies or tools (n=19), enhancing student learning (n=17), using new teaching methods/approaches/techniques (n=16), using existing technologies in new ways (n=8), doing something new or novel (n=6), enhancing teaching (n=5), bringing technology into traditional classroom teaching (n=3), using TELT to resolve an issue or problem (n=3), blended learning (n=1), providing evidence of effectiveness (n=1) and 'Don't know' (n=1).

In the focus groups, both early adopters and the majority considered innovation to be using technology to enhance student learning:

> *"…anything which enhances the student learning. Even if it's a small … increase in their interest, if you can use technology to do that, I mean, that would be…to me, that would be an innovation." (EA3)*

> *"As head of first year in [my subject] … I'm interested from that viewpoint, you know, how we can use technology to provide better support to students." (EM2)*

Intrinsic characteristics

There were no significant differences between the groups in terms of self-efficacy (Table 2). Similarly, there were no significant differences between the groups in terms of risk-taking versus conservativism (Table 3); however, there did appear to be a trend in that innovator-adopters tend to seek solutions based on unproven ideas rather than tried and tested methods, and that they were more interested than the other groups in finding problems to solve, rather than solving problems.

Table 2 Teacher self-efficacy across the three categories (SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree; I/EA =Innovator/early adopter, EM=Early majority, LM=late majority)

Self-efficacy		% SD	% D	% N	% A	% SA	p=
When a student does better than usual, many times it is because I exerted a little extra effort	I/EA			●			.881
	EM			●			
	LM			●			
If one of my students could not do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty	I/EA				●		.971
	EM				●		
	LM				●		
If a student masters a new concept quickly, it is probably because I knew the necessary steps in teaching that concept	I/EA			●			.674
	EM			●			
	LM			●			
	I/EA			●			.094
	EM				●		

If a student did not remember the information I gave in a previous lesson, I would know how to increase their retention in the next lesson	LM			●			
When I really try, I can get through to the most difficult students	I/EA				●		.351
	EM				●		
	LM			●	●		
If a student in my class becomes disruptive and noisy, I feel assured to know some techniques to redirect them quickly	I/EA				●		.369
	EM				●		
	LM				●		
When a student is having difficulty with a task, I am usually able to adjust to their level	I/EA				●		.165
	EM				●		
	LM				●		

	0%		25%		50%		75%		100%

Table 3 Risk-taking versus conservativism across the three categories (RT=risk-taking, C=conservative; I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

Risk-taking versus conservativism		% RT	% C	p=
When I encounter difficulties in learning and teaching, I seek solutions based on: (RT) unproven ideas (C) tried and tested methods	I/EA			.648
	EM			
	LM			
When involved in a teaching related project: (RT) I forget that other people are involved and probably should be consulted (C) I am considerate of all other group members	I/EA			.324
	EM		94	
	LM			
When faced with challenges in teaching administration: (RT) I bend the rules to find a working solution (C) I stick to established rules and guidelines	I/EA			.483
	EM			
	LM			
When assessing student work: (RT) I work best for short periods of high intensity (C) I can maintain accuracy for long periods of time	I/EA			.615
	EM			
	LM			
In relation to learning and teaching, I have a strong command of: (RT) Specialised pedagogical literature (C) General pedagogical literature	I/EA			.186
	EM			
	LM			
As a teacher in higher education, I am interested in: (RT) Finding problems to solve (C) Solving problems	I/EA			.462
	EM			
	LM			

	0%		25%		50%		75%		100%

In terms of use of e-learning systems, a greater proportion of innovator-adopters engaged students in deep thinking through online discussions (Table 4, p=0.040). While not significant, a similar trend was observed with providing an online space for knowledge building.

Table 4 Use of e-learning systems across the three categories (I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

		% Use	p=
To provide easy access to course materials and administrative information	I/EA		.397
	EM		
	LM		
To provide up-to-date, additional learning resources at point of need	I/EA		.943
	EM		
	LM		
To provide a space for student questions and staff announcements	I/EA		.240
	EM		
	LM		
To engage students in deep thinking through online discussions	I/EA		.040*
	EM		
	LM		
To provide an online space for building knowledge	I/EA		.350
	EM		
	LM		

	0%		25%		50%		75%		100%

In the focus group, early adopters stated that they were using innovative approaches as well as established TELT solutions but were still reluctant to adopt innovations where there was a risk of failure:

> *"[I'm] not really at the bleeding edge of technology, more the kind of cutting edge … There's a lot of blood, sweat and tears at that level too, to implement it, especially with large numbers. 'Cause you're at the stage where it has to work, otherwise you are in an awful lot of trouble with 250 students where you messed up." (EA2)*

One of the early majority stated that they would need to be convinced of the benefits of TELT with large numbers of students, and that learning technologies needed to be well established:

> *"I'm quite conservative before I let this loose on 600 students. So, I would like to be convinced that there is an actual benefit … robust and reliable, and also sustainable." (EM2)*

Confidence and digital practitionership

In terms of digital practitionership (Table 5), there were no significant differences at the access level and most of the skills level, except for innovator-adopters being more confident about teaching themselves to use new software (p=0.008). There were significant differences in practices such as designing TELT activities to suit student needs, exploring the capabilities of a technology for learning, evaluating digital academic practice, and reflecting on innovations in teaching practice (p<0.001 for all). At the highest level of the digital practitioner framework (attributes), innovator-adopters were more confident in their attitude to TELT (p<0.001), more willing to invest time in exploring and evaluating TELT (p<0.001), more able to balance the risk of innovation with its potential for learning (p=0.003) and more convinced of the potential of technology to enhance and transform learning (p=0.003).

Table 5 Digital practitionership across the three categories (SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree; I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

			% SD	% D	% N	% A	% SA	p=
Access	I have access to necessary hardware for engagement in TEL	I/EA				●		.074
		EM				●		
		LM			●			
	I have access to necessary software for engagement in TEL	I/EA				●		.090
		EM				●		
		LM			●			
	I have reliable access to wi-fi	I/EA				●		.207
		EM				●		
		LM				●		
	I have access to learning technology professionals who can support me in using TEL	I/EA			●			.857
		EM			●			
		LM			●			
Skills	I can manage the blurring of boundaries between private and work time	I/EA			●			.569
		EM			●			
		LM			●			
	I can teach myself to use new software (e.g. apps)	I/EA				●	●	.008**
		EM				●		
		LM				●		
	I can teach myself to use new hardware (e.g. devices)	I/EA				●		.056
		EM				●		
		LM				●		
	I can evaluate the suitability of digital content for my students	I/EA				●		.416
		EM				●		
		LM				●		
Practices	I design TEL activities to suit my students' learning needs	I/EA				●		<.001***
		EM			●	●		
		LM			●			
	I explore the capabilities of a technology for learning	I/EA				●		<.001***
		EM				●		
		LM		●				
	I evaluate my digital academic practice	I/EA				●		<.001***
		EM				●		
		LM		●				
	I reflect on innovations within my teaching practice	I/EA				●		<.001***
		EM				●		
		LM		●	●			
Attributes	I am confident in my attitude to TEL	I/EA				●		<.001***
		EM				●		

		LM		●				
	I am willing to invest time in exploring and evaluating TEL	I/EA				●		<.001***
		EM				●		
		LM			●			
	I am able to balance the risk of innovation with its potential for learning	I/EA				●		.003**
		EM				●		
		LM			●			
	I am convinced of the potential of technology to enhance and transform learning	I/EA				●		.003**
		EM			●	●		
		LM			●			

	0%		25%		50%		75%		100%

Professional development

In terms of previous engagement with developmental TELT opportunities (Table 6) the only significant difference related to college teaching awards; more innovator-adopters applied and were successful than early majority, while none of the late majority had applied (p=0.030).

Table 6 Previous engagement with teaching innovation opportunities across the three categories (I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

		% Not applied / nominated	% Applied/ nominated	% Awarded	p=
Internal L&T project funding	I/EA				.296
	EM				
	LM				
College Teaching Excellence Award	I/EA				.030*
	EM				
	LM				
Recognising Excellence in Teaching (RET) or equivalent scheme	I/EA				.065
	EM				
	LM				
External L&T project funding	I/EA				.445
	EM				
	LM				

	0%		25%		50%		75%		100%

Preferences for different CPD methods (Table 7) revealed the most positively rated method by all three groups to be learning informally with colleagues. Late majority staff lagged behind the other groups in all other categories; one example being engagement with specialist learning technology communities which none of the late majority had engaged with (p=0.021). There were also significant differences in terms of reading about TELT (p=0.007), attending events hosted by external organisations (p=0.021), attending informal institutional CPD (p=0.003) and formally applying for recognition of good practice (p=0.026).

Table 7 Usefulness of CPD methods across the three categories (I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

			% Never used	% Not at all useful	% Not very useful	% Somewhat useful	% Useful	% Extremely useful	p=
Self-directed, informal learning	Reading relevant journal articles and book chapters	I/EA				●			.007**
		EM				●	●		
		LM			●				
	Undertaking Massive Open Online Courses (MOOCs) on blended/online/innovative learning and teaching	I/EA			●				.059
		EM	●	●					
		LM	●						
	Learning informally from and with colleagues	I/EA					●		.392
		EM					●		
		LM					●		
Communities of practice	Joining an online learning technology community e.g. Association for Learning Technology (ALT), or the Learner Experience Research SIG (ELESIG)	I/EA		●					.002**
		EM		●					
		LM	●						
	Participating in a mentoring scheme, working with a more experienced teacher as a 'critical friend'	I/EA		●					.126
		EM			●	●			
		LM	●						
Events	Attending events hosted by external organisations such as ALT, ELESIG, the Higher Education Academy (HEA)	I/EA				●			.021*
		EM		●	●				
		LM	●						
	Attending informal institutional CPD e.g. [central] events, Learning and Teaching conference	I/EA					●		.003**
		EM			●	●			
		LM	●						
Formal learning and recognition	Undertaking a credit-bearing postgraduate taught programme such as the PGCAP or MEd	I/EA				●			.513
		EM			●				
		LM			●				
	Applying for recognition of good practice, e.g. through Recognising Excellence in Teaching (RET) or Advance HE (P/S/FHEA)	I/EA	●						.026*
		EM		●					
		LM	●						
	Undertaking a research degree relating to learning and teaching in higher education	I/EA	●						.160
		EM	●						
		LM	●						

	0%		25%		50%		75%		100%

In the focus group, early adopters emphasised the importance of serendipitous conversations as well as more formal institutional networks which allowed for sharing practice across disciplines:

> *"… you' be surprised that a First Year Course Coordinator in Physics has as much in common with a First Year Course Coordinator in Theatre Studies. But it's exactly the same problems with very different kind of bent and direction. The problems we had, everybody could identify with, and so there was that kind of common thread." (EA2)*

One of the early majority highlighted the relevance of central events as well as learning from colleagues in their own or cognate disciplines:

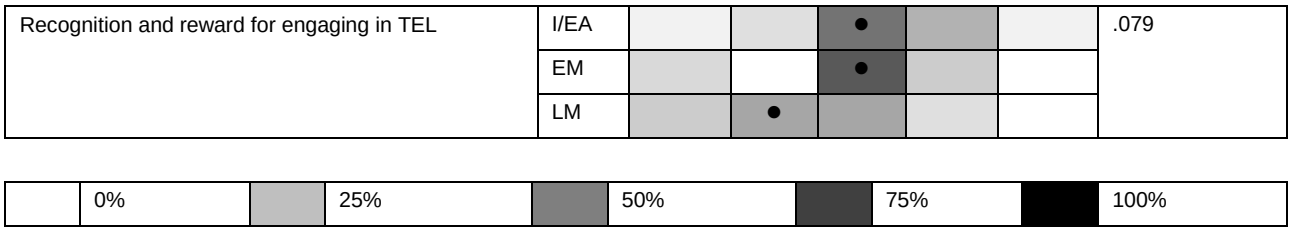
> *"I quite like some of the [central] CPD events that […] run at lunchtime. I've been to some of them … especially if it's something at your own college it would be more relevant to you and you're going to learn some things that they're doing …" (EM3)*

Contextual factors

Table 8 indicates that only two contextual factors generated a significant difference between the groups; perceived level of head of school or management for engaging with TELT (p=0.017) where innovator-adopters considered this more of an enabler than a barrier, and the presence of a community of practice of educators using TELT (p=0.008) where innovator-adopters and early majority considered this to be more of an enabler than a barrier, unlike most of the late majority staff.

Table 8 Contextual factors across the three categories (SB=Significant barrier, B=Barrier, N=No influence, E=Enabler, SE=Significant enabler; I/EA =Innovator/early adopter, EM=early majority, LM=late majority)

Contextual factors		% SB	% B	% N	% E	% SE	p=
Access to local learning technology support	I/EA			●			.425
	EM			●			
	LM			●			
Access to necessary equipment to engage with TEL	I/EA			●			.559
	EM			●			
	LM			●			
Reliability and robustness of technology in the classroom	I/EA			●			.761
	EM			●			
	LM			●			
Amount of time to experiment with TEL	I/EA		●				.154
	EM	●					
	LM		●				
Students' level of comfort using technology for learning	I/EA				●		.608
	EM			●			
	LM			●			
Level of support from head of school or management re: engaging with TEL	I/EA				●		.017*
	EM			●			
	LM			●			
Level to which TEL is seen as an institutional priority	I/EA			●			.313
	EM			●			
	LM			●			
Colleagues attitude to, and support for, use of TEL	I/EA			●			.085
	EM			●			
	LM			●			
Presence of a community of practice of educators using TEL	I/EA			●			.008**
	EM			●			
	LM			●			



In the focus groups, early adopters considered enablers to include central academic developers reaching out to highlight new developments, sharing practice at the first year course coordinators network, the TELT contacts group (TELT advocates in different disciplines across the university), and the university learning and teaching conference. Relationships with helpful contacts was also seen as an enabler, including IT and learning technology specialists. The concept of serendipity was frequently mentioned, including in relation to conversations with colleagues:

> *"…it's very informal, but the colleagues that I sort of associate with have mutual interests … it's kind of informal and just kind of like bumping into people and something comes up and not necessarily when you're expecting it. So I find a lot of my ideas and so on come from just happenstance." (EA1)*

The early majority considered enablers to include seeing colleagues use TELT effectively with students, the university learning and teaching conference, learning technology support and time. They recognised the benefits of early adopters investing time on behalf of the school:

> *"…basically you need one person. I mean the latest example we have for our…in our school are online materials for labs, both the preparatory information and then online lab reports, and like in first and second year labs, and essentially that there is one person, I think, essentially spent an entire summer, you know, setting this up …" (EM2)*

Barriers for early adopters included lack of time, and being constrained by a limited range of supported learning technologies:

> *"Time. In capitals please." (EA2)*

> *"…there's a sense that we're constrained by what technology the university has blessed." (EA1)*

In terms of support from the institution, early adopters wanted the institution to be more flexible towards technologies to support innovation, to recognise their efforts being invested for the greater good, and to provide substantial and responsive funding for innovations. They referred to the difficulty maintaining communities of practice, arguing that central academic developers had a role to play in organising these:

> *"…'cause there's nobody to quite drive it and organise it, which is actually the problem with many of these things … if you don't have somebody allocated going, hey this is my little thing, let's organise it, come on guys, who's going to give a talk this year, does anybody know anybody, and just kind of push it out there …" (EA2)*

Discussion

The findings indicate that teachers construe the concept of teaching innovation (RQ1) either as undertaking something 'new' in relation to academic practice or enhancing learning using technology. These definitions were broad compared to the characteristics identified in the literature review. It is possible that the title of the survey may have encouraged some staff to equate innovation with TELT, or this may just reflect the increasingly blended nature of learning and teaching across the institution (Adekola, Dale, & Gardiner, 2017), reflected in the sector (Maguire, Dale, & Pauli, 2020).

In terms of the intrinsic characteristics of innovate-adopters versus the majority (RQ2), there were no statistical differences between the groups in relation to self-efficacy or risk-taking, unlike other studies (Hsu, 2016; Klaeijsen et al., 2017; Wilson & Stacey, 2004). This may reflect the limited questions taken from other inventories, and the relatively small sample size. However, innovator-adopters displayed conceptions and use of e-learning associated with more collaborative activities, which has implications given the increased focus on active learning in higher education (Hood Cattaneo, 2017). Clearly, if students are expected to engage in more active learning, educators need to be able to support that in blended and online learning, as well as on campus. The survey also revealed that innovator-adopters displayed a significantly higher level of digital practitionership, particularly the learning of new software, various digital practices, and digital attributes. The focus group findings corroborated this; for example, the willingness of early adopters to invest time learning new technologies in order to support their colleagues, while early majority staff considered themselves to be time poor, preferring early adopters to establish proof of concept first. Despite the leading role played by early adopters, fear of failure came up in both focus groups; this is a recognised barrier to engaging in TELT, associated with 'emotional work' (Bennett, 2014). Another relevant finding was that early adopters can transfer learning from other disciplinary contexts while early majority prefer to learn from their own or cognate disciplines; this aligns with the observations of Wilson and Stacey (2004).

In terms of extrinsic factors (RQ3), organisational climate–reflected in support from the head of school or management–was considered more of an enabler than a barrier by innovator-adopters. This could mean that they had the persistence to overcome management reservations, or that they were more successful in persuading management of the benefits of TELT. The importance of organisational climate has been highlighted in terms of supporting institutional transitions to blended learning; this includes management providing leadership, support and resources and rewarding staff engaged in blended learning, as well as an institutional culture that enables innovation and calculated risk-taking, provides appropriate infrastructure, support for learning technology use, attends to digital equity, and encourages student-centred digital pedagogies (Adekola et al., 2017). Innovator-adopters also considered the presence of a community of practice to be more of an enabler than a barrier. This might suggest either a greater awareness of communities of practice among innovator-adopters, or that the majority feel less able or qualified to engage in these communities. This is important, given that learning informally with other colleagues was shown to be the single most frequent CPD that all groups engaged with and found useful, and suggests that this may be the most impactful form of CPD (RQ4). Informal serendipitous conversations have been recognised as a context for professional learning (Haigh, 2005). Communities of practice were also highlighted in the focus groups, and clearly there is a role for academic developers to support these. As noted by Vogel (2010, p.39), "Academic developers can work as an institution's memory by recording and disseminating successful endeavours and informative failures … they are in a position to broker and help to sustain mutually supportive connections between academics". It appears that innovator-adopters make better use of other types of CPD: reading, professional special interest groups and external events, internal events, and applying for recognition of good practice.

Before the Covid19 pandemic, it was recognised that institutional adoption of blended learning had to be catalysed (Graham et al., 2013; Porter et al., 2014), and this was enabled at UofG through strategic projects that attracted early adopters. Subsequently, significant work has been done across the university to provide training, support, and access to a broader range of learning technologies to all staff. Given the need for remote and blended learning as a result of the pandemic, it is essential that all teachers are fully supported to develop their digital practice through appropriate CPD opportunities. This inevitably means becoming an innovative university that embraces online and blended learning (Christensen & Eyring, 2011) eschewing the risk aversion and ambient conservativism that leads to resistance to change and replication of existing practices (Bryant, 2015), and sustaining opportunities for serendipitous conversations. Early adopters have a leading role to play in terms of championing innovation, often in the face of resistance (Watty, McKay, & Ngo, 2016). Indeed, early adopters in this study went on to contribute to flexible learning working groups responding to the need for emergency remote teaching in this college, establishing standardised learning, teaching and assessment protocols and processes (see Singer et al., this issue). The question remaining is whether we will continue to see the same level of resistance once the current situation has stabilised; will all academics become innovator-adopters or will we still observe a 'reluctant majority'? Might the forced transition to remote and blended learning overcome the fear of failure and 'emotional work' (Bennett, 2014) associated with TELT? Or might the emotional demands on a population that has increasingly experienced stress and burnout over the last year (Shen & Slater, 2021) increase the gap? Time will tell; in the meantime, academic developers we must do what we can in partnership with our academic colleagues to fully support them and in turn, their students.

The authors acknowledge the limitations of this study; specifically, it was conducted in a single college in one HEI with a relatively low sample size. Attention has been paid to the details of the study to enhance believability and robustness (Coughlan, Cronin, & Ryan, 2007; Ryan et al., 2007). Future research should continue to investigate the characteristics and digital practices of all academic staff, as well as learning how best to support them to create pedagogically effective digital education that enhances student learning and outcomes in order to prepare graduates for an uncertain future.

Biographies

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