INSTITUTE OF EDUCATION

The role of educational technology in fostering student engagement

Researching Student Engagement: Impulses for Higher Education
Zurich University of Teacher Education, ZHE Webinar series
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Webinar schedule

1. Presenter background
2. How did I approach my SE conceptual framework?
3. Systematic review methodology
    > Benefits and challenges
4. Bioecological student engagement framework
5. Technology and student engagement
6. Flipped learning
    > Research pre- and during COVID-19 pandemic
7. Implications for practice and research

My background

- Born and raised in South Australia
- High school teacher (10 years)

  > German, Humanities, IT, English, Drama, Music...

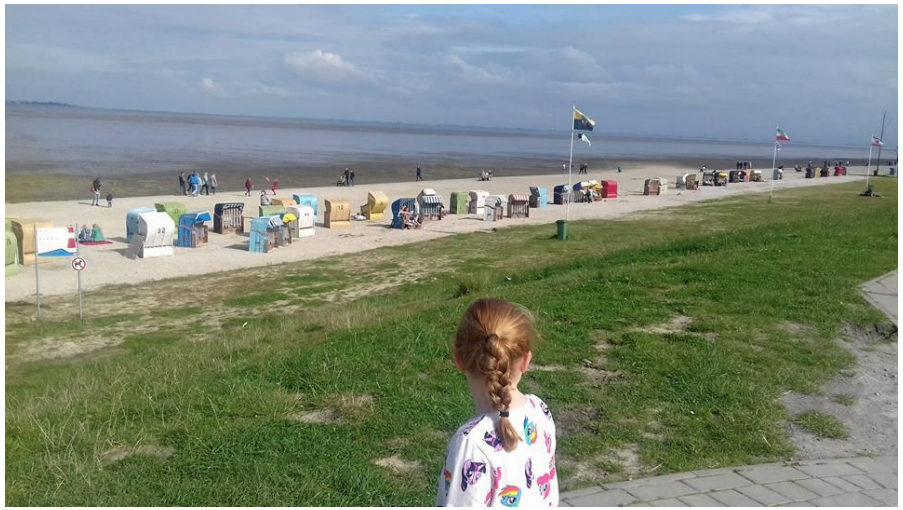
My background

- Research Associate

  > CvO Universität Oldenburg, 2017-2020

  > ActiveLearn project

  > PhD, 2020 – *Facilitating student engagement through educational technology: Current research, practices and perspectives*



My background

- EPPI-Reviewer Support Officer
  - > University College London
  - > since Feb 2020
- Systematic & mapping reviews
  - > T&L during COVID-19
  - > Methodological support

Student engagement conceptualisation

Like a black box[1]

"A catch-all term"[2]

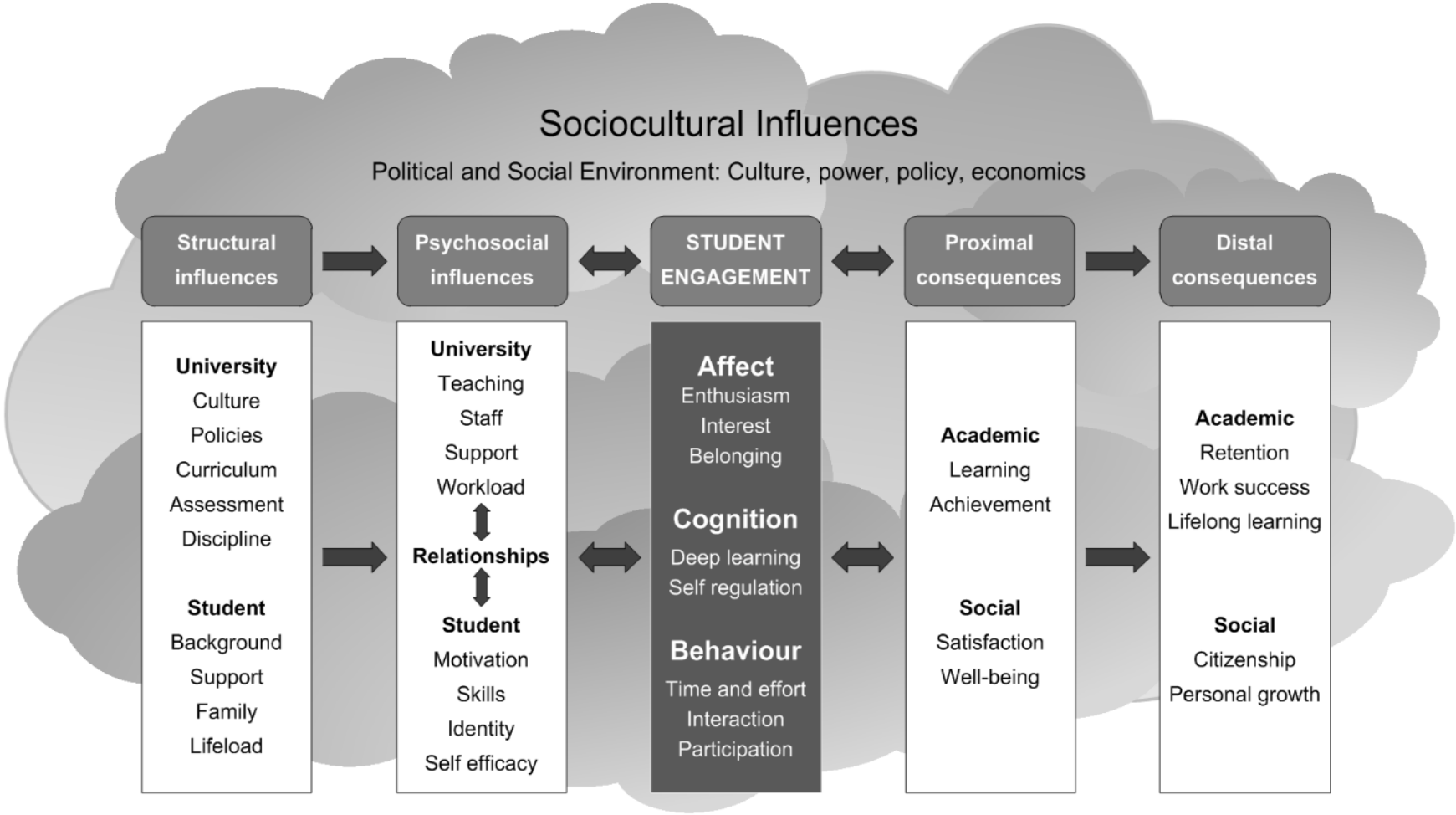
Suffers from indigestion[3]

"One of the most widely used and overgeneralised constructs found in the educational, learning, instructional and psychological sciences."[4]

"3 blind men describing an elephant"[5]

1. Bryson & Hardy (2011)
2. Krause (2005, p. 3)
3. Zepke (2018, p. 43)
4. Azevedo (2015, p. 84)
5. Eccles (2016, p. 71); also Baron & Corbin (2012)

Kahu's (2013) student engagement framework



Student engagement framework – higher education, Kahu (2013, p. 766), reprinted with permission

Educational technology and engagement

- Improved self-regulation & self-efficacy[1]
- Increased participation & involvement[2]
- Increased involvement in the wider school/uni community[3]

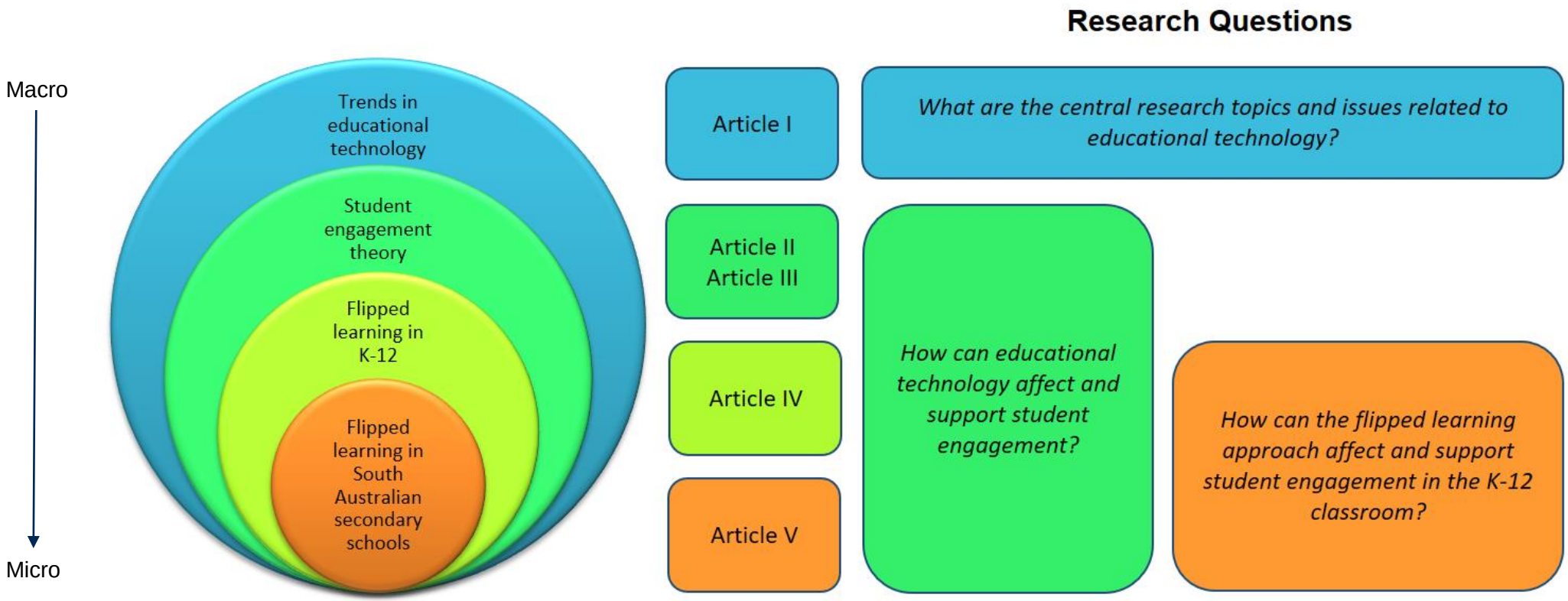
- **Ed tech research has lacked theoretical guidance**
  - Lack of theoretical frameworks[4]
  - Definitions & operationalisations of student engagement widely differ[5]

1. Alioon & Delialioglu (2017); Bouta, Retalis & Paraskeva (2012)
2. Salaber (2014); Northey, et al. (2015); Alioon & Delialioglu (2017)
3. Junco (2012); Alioon & Delialioglu (2017)
4. Hew et al. (2019); Karabulut et al. (2018)
5. Henrie, Halverson & Graham (2015)

Dissertation Structure

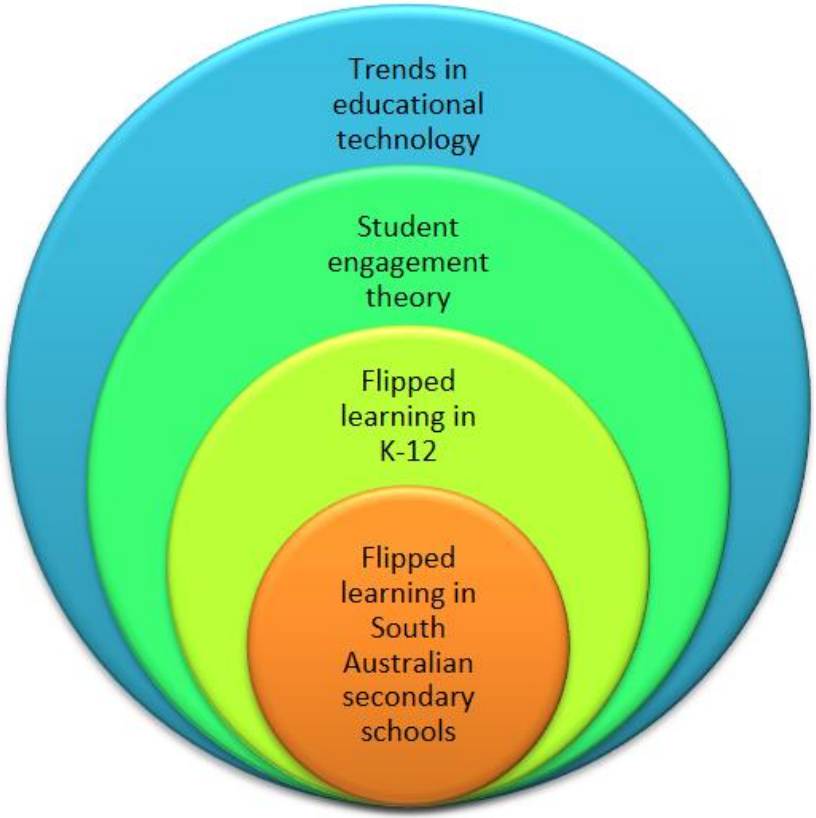
PhD by publication using a social constructivist paradigm[1]

- Macro overview, narrowing to micro examples



1. Terre Blanche, Kelly, & Durrheim (2006)

Methodology



Article I

What are the central research topics and issues related to educational technology?

Qualitative Content Analysis[1]

British Journal of Educational Technology, 1970-2018

Article II
Article III

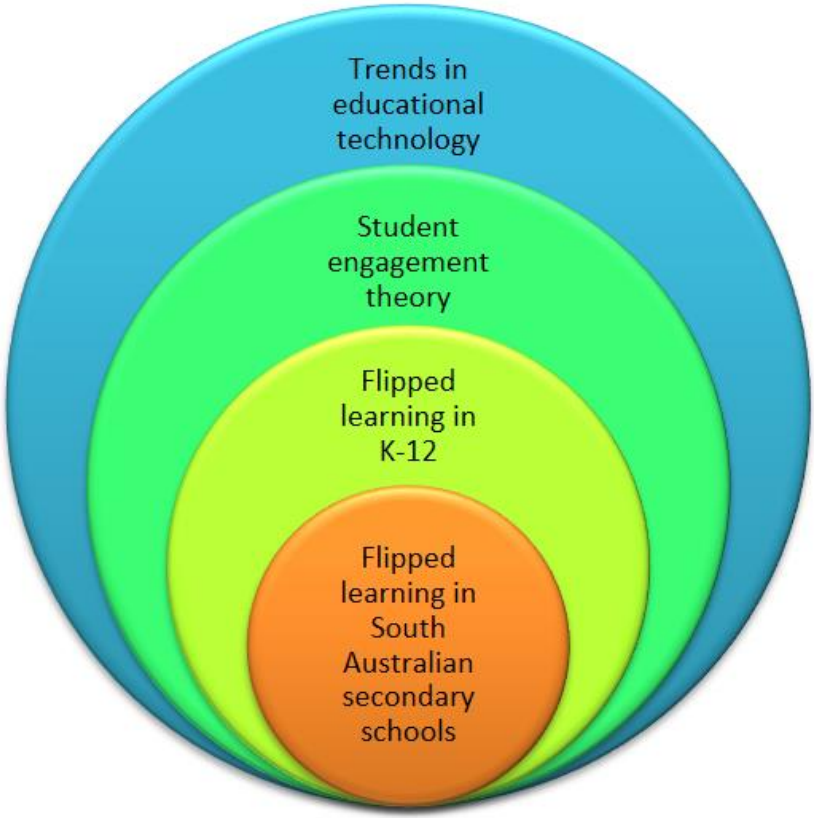
How can educational technology affect and support student engagement?

Theoretical review and framework development

- *Grounded theory*[2]
- *Article II: Systematic review*[3]
- *Article III: Conceptual framework development*[4]

1. Bond, Zawacki-Richter, & Nichols (2019)
2. Glaser & Strauss (1967); Charmaz (2008)
3. Bond, Buntins, Bedenlier, Zawacki-Richter, & Kerres (2020)
4. Bond & Bedenlier (2019)

Methodology



Article IV

How can educational technology affect and support student engagement?

How can the flipped learning approach affect and support student engagement in the K-12 classroom?

Systematic literature review[1]

Flipped learning and student engagement in K-12

Article V

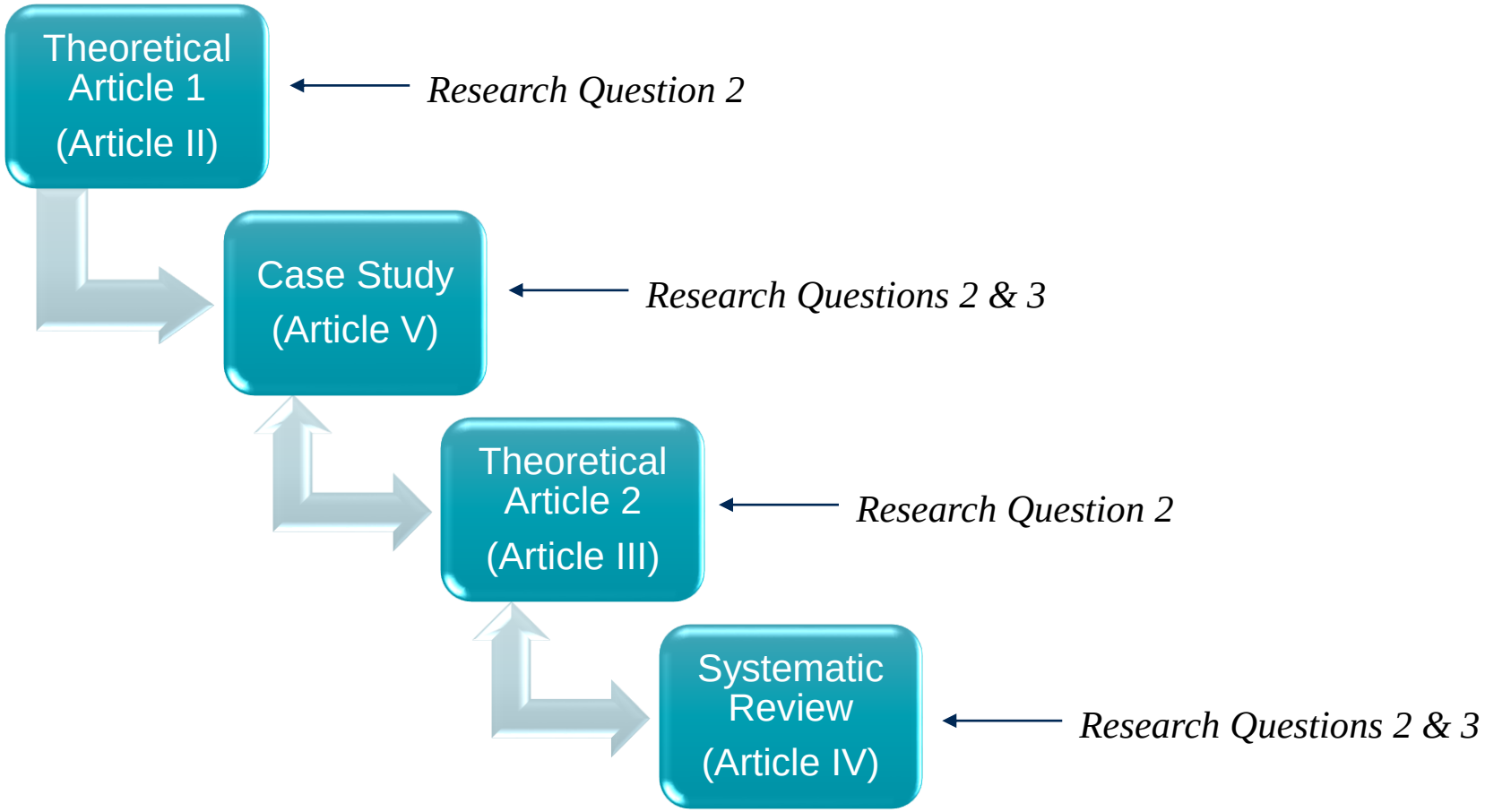
How can the flipped learning approach affect and support student engagement in the K-12 classroom?

Case Study[2]

Flipped learning in two South Australian high schools

1. Bond (2020)
2. Bond (2019)

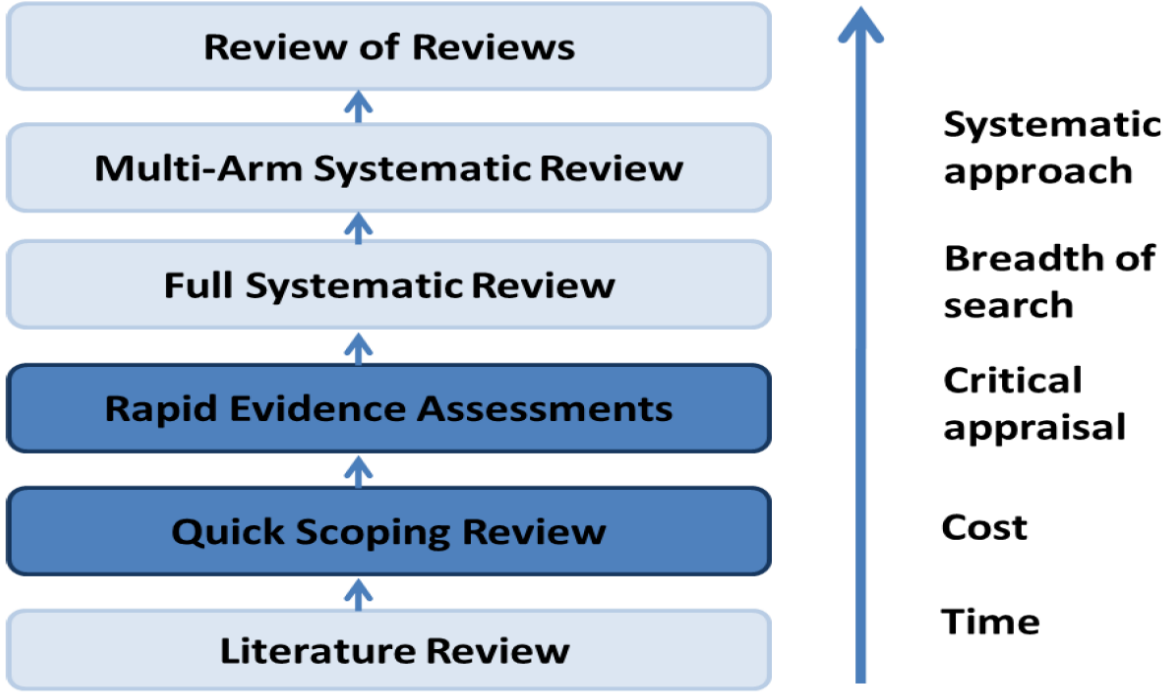
Conceptual framework development



Systematic review methodology

- "a review of research literature using systematic and explicit, accountable methods" (Gough, Oliver & Thomas, 2012, p. 2)
  - ➢Transparent and explicit
  - ➢Replicable and updatable
  - ➢Identify gaps, contradictions or (in)consistencies

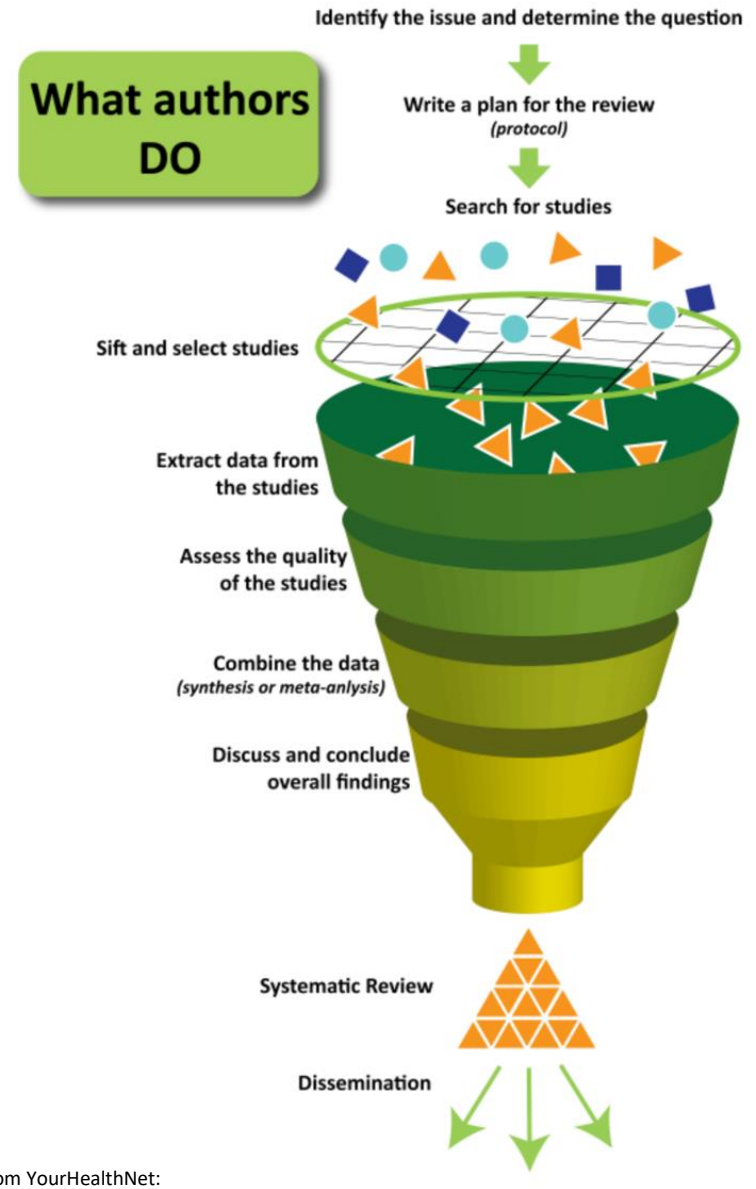
- “Rather than looking at any study in isolation, we need to look at the body of evidence” (Nordenbo, 2009, p. 22)



Collins, Coughlin, Miller, & Kirk (2015, p. 1)

Systematic review process

- Review question and conceptual framework
- Search strategy: search string and selection criteria
- Study screening
  - Title & Abstract
- Study retrieval
- Screen on full text
- Data Extraction
- Quality assessment
- Synthesis
- Report



Retrieved from YourHealthNet: http://navigatingeffectivetreatments.org.au/exploring_systematic_reviews.html (12 Feb, 2019)

Challenges

- Understanding of method
- Software
- Scope and retrieval
- Resources (time and people)

Benefits

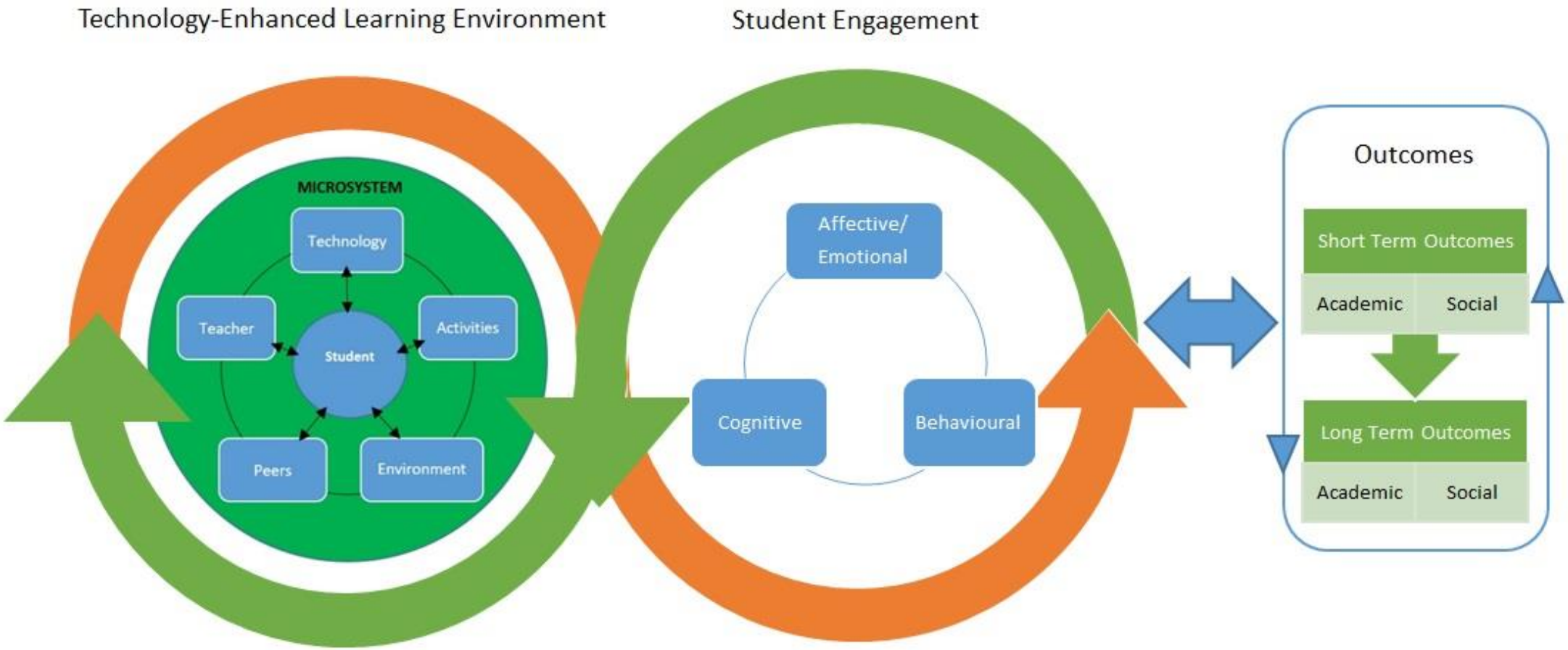
- Search and retrieval skills
- Exposure to many research & writing styles
- Broad understanding of a topic
- Identification of research gaps

What is student engagement?

Student engagement is the **energy and effort** that students employ within their learning community, observable via any number of **behavioural, cognitive or affective** indicators across a continuum. It is shaped by a range of **structural and internal influences**, including the complex interplay of relationships, learning activities and the learning environment. The more students are engaged and empowered within their learning community, the more likely they are to channel that energy back into their learning, leading to a range of short and long term outcomes, that can likewise further fuel engagement.[1]

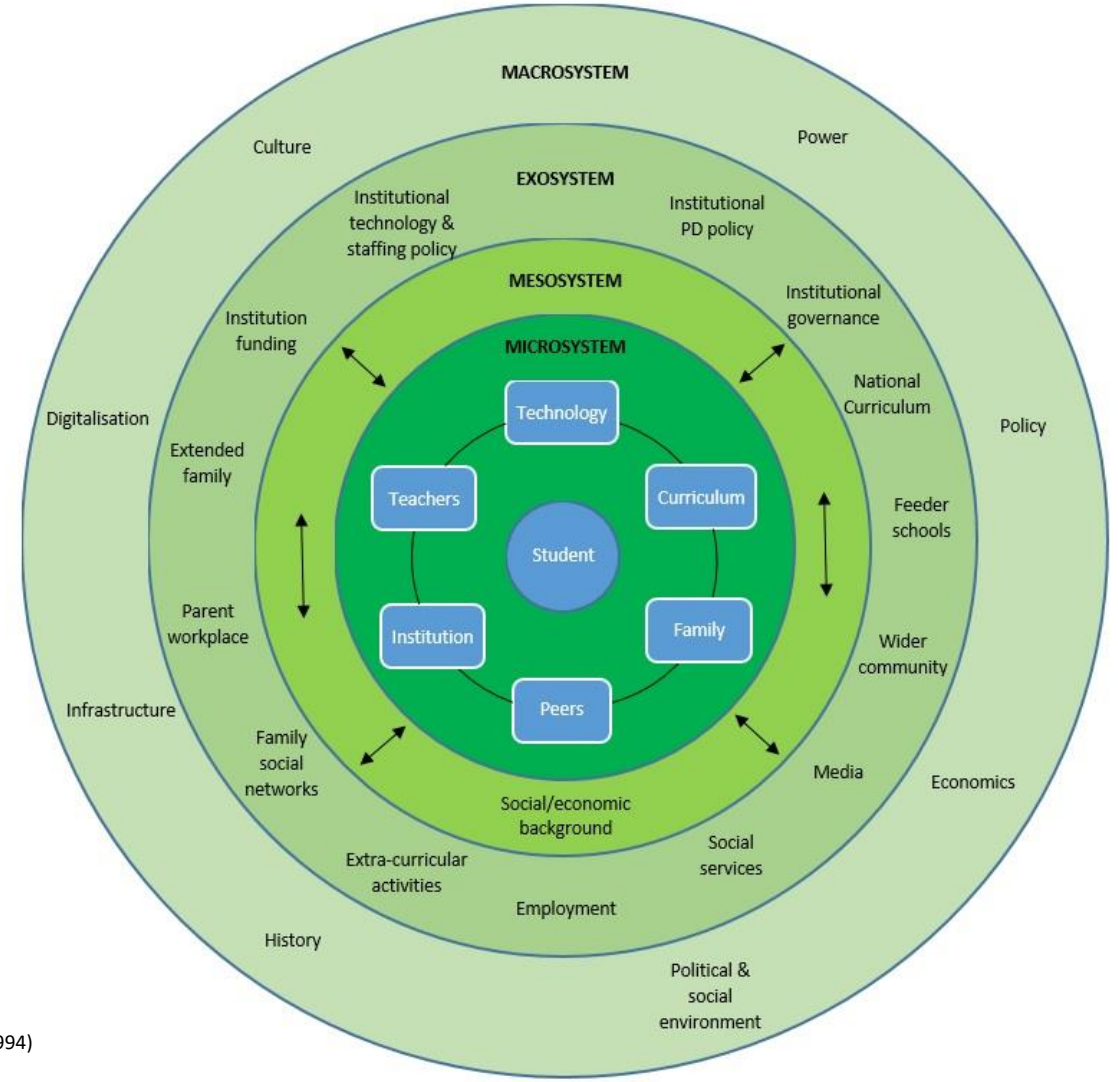
1. Bond, Buntins, Bedenlier, Zawacki-Richter, & Kerres (2020, p. 3)

Student engagement framework[1]



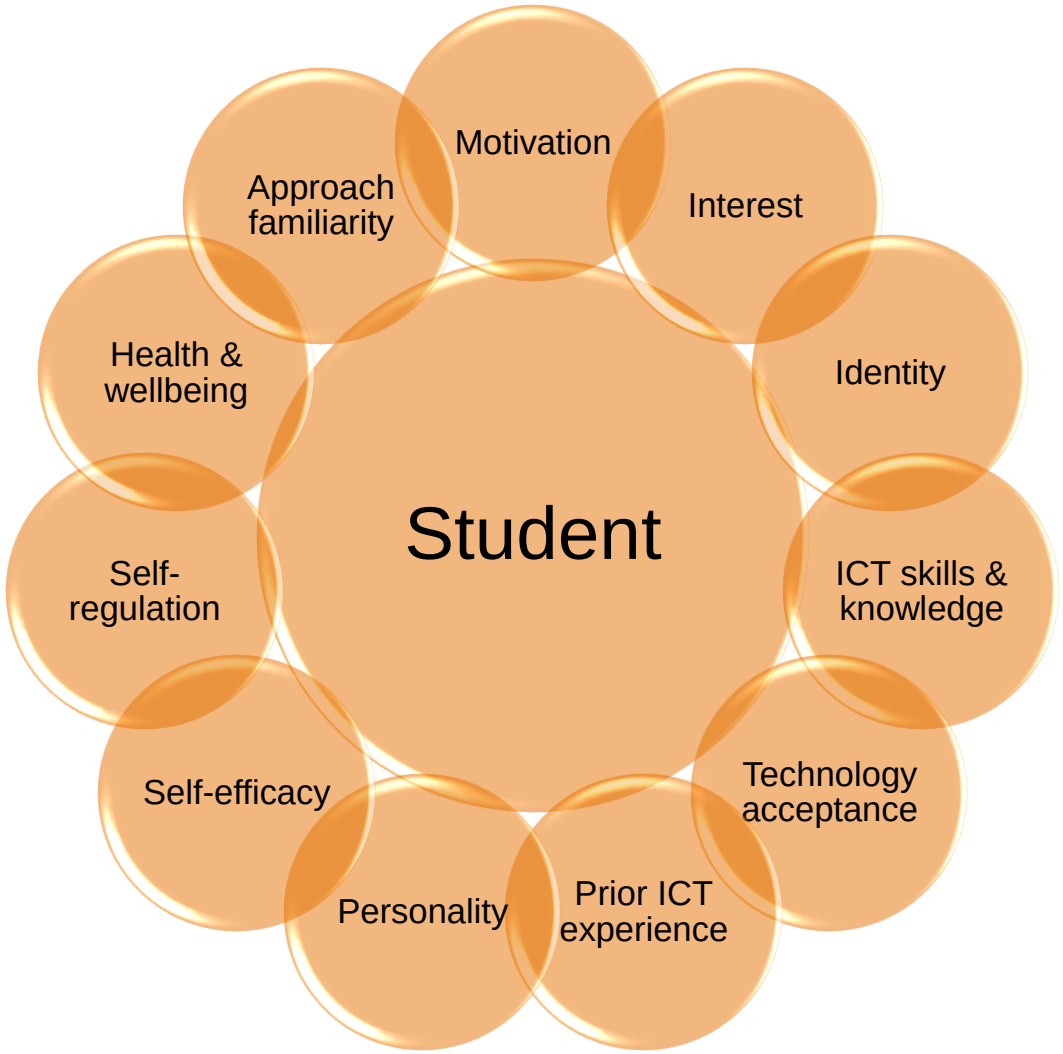
1. Bond & Bedenlier (2019, p. 8)

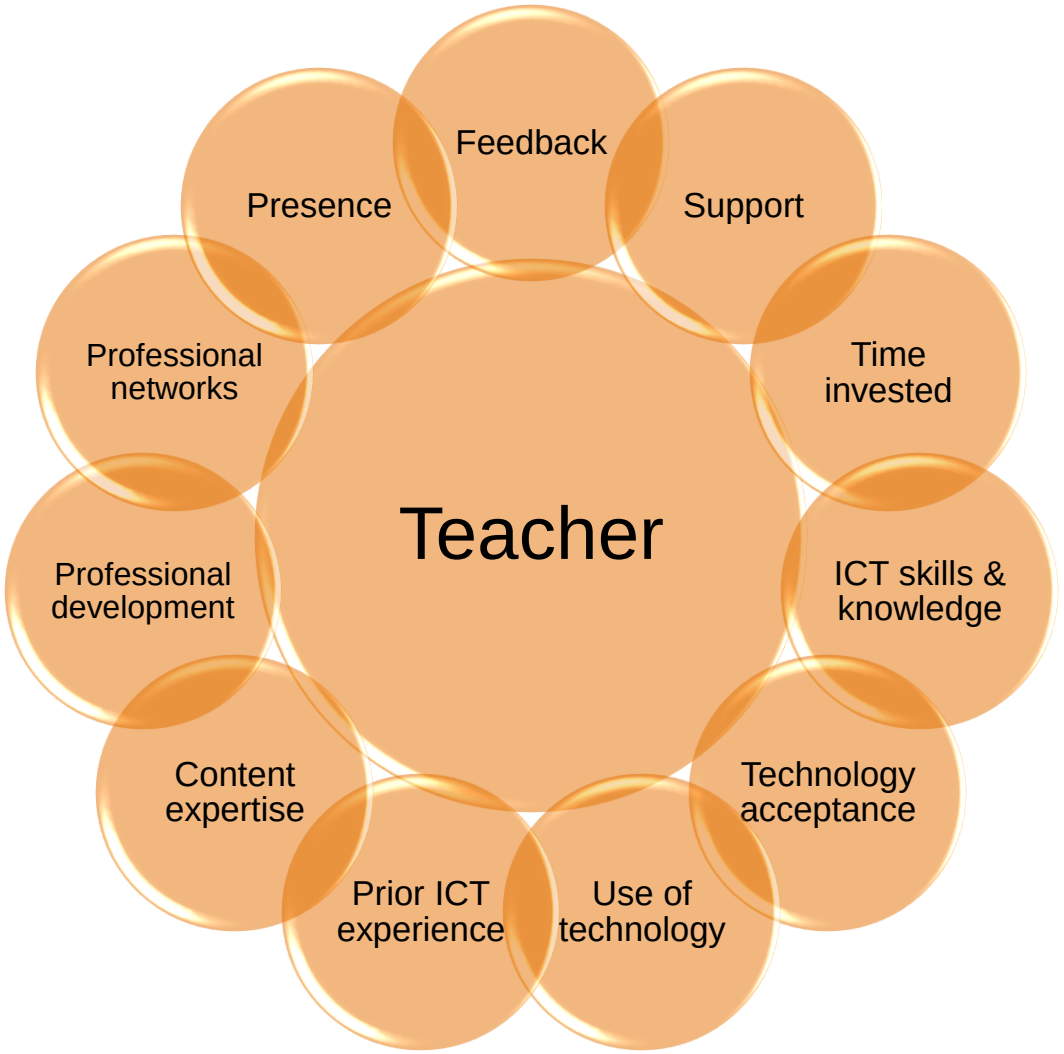
Bioecological Student Engagement Framework



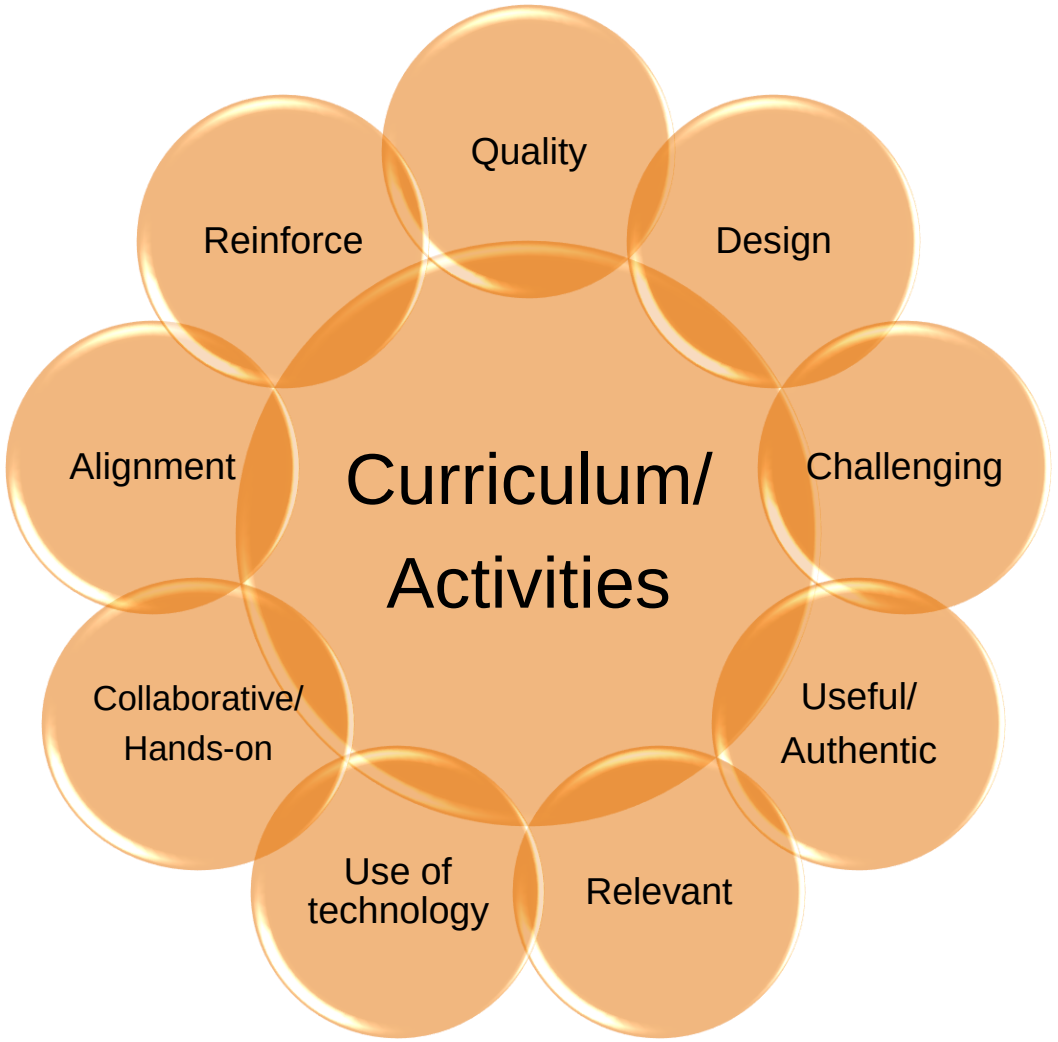
Adapted from Bronfenbrenner (1979; 1986) & Bronfenbrenner & Ceci (1994)

Internal/external influences on student engagement

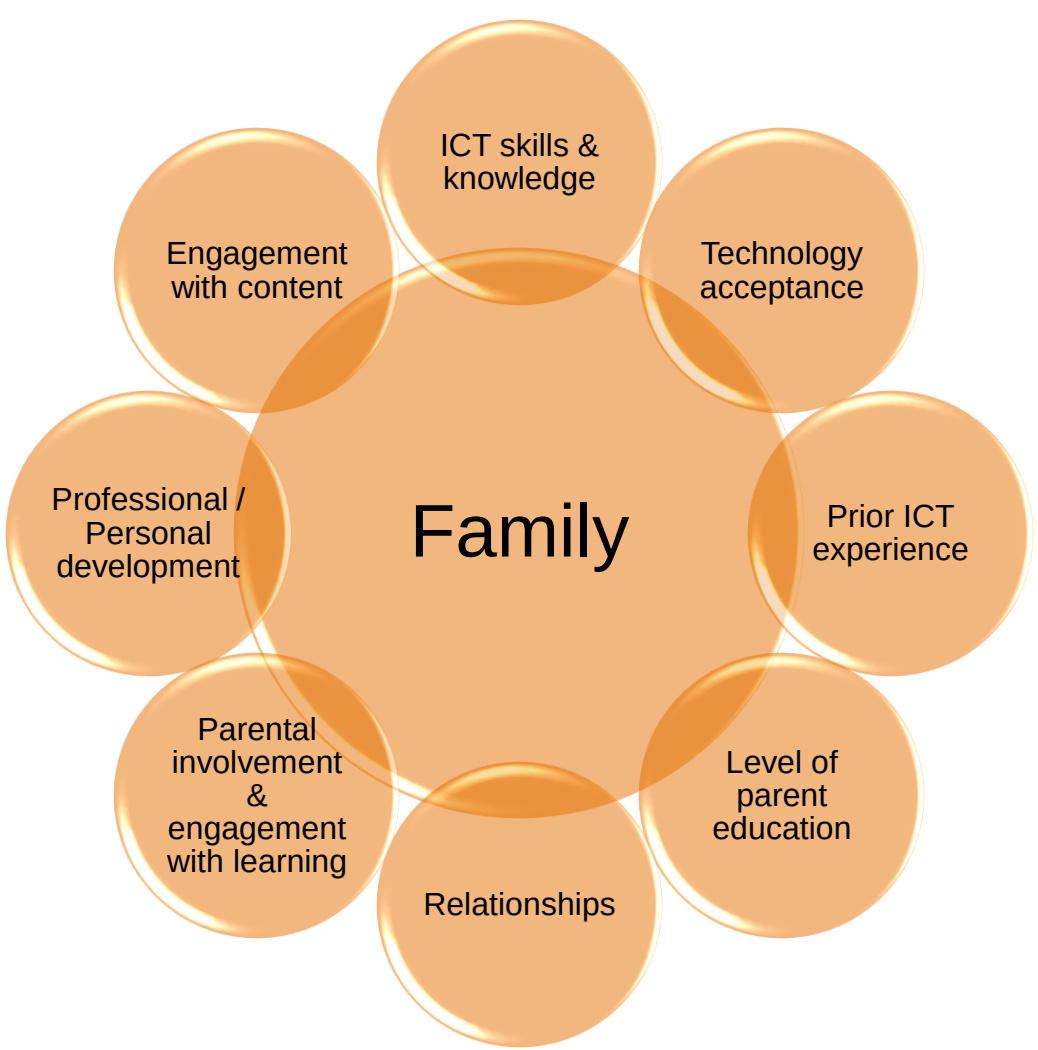


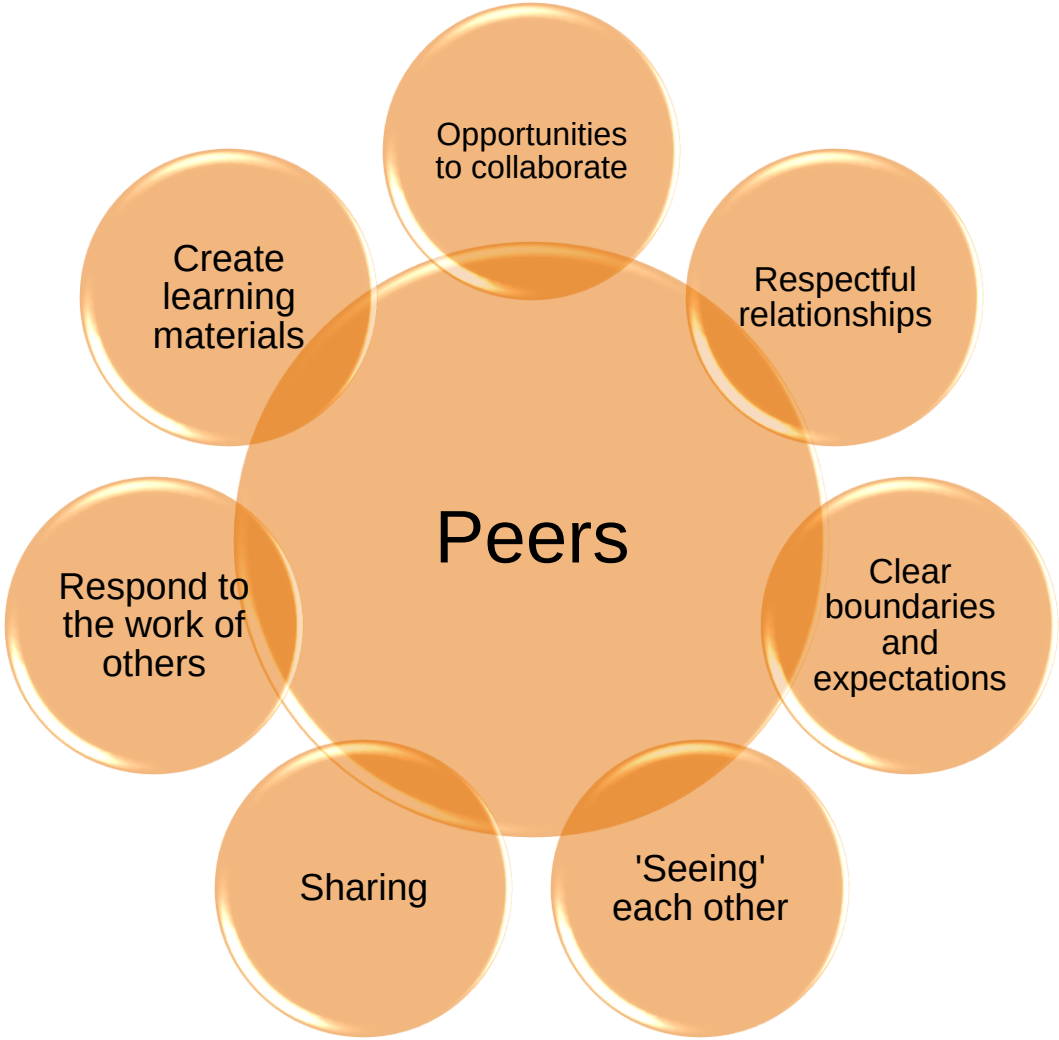


External influences on student engagement



External influences on student engagement





Facets of engagement

Behavioural	Affective	Cognitive
Effort	Enthusiasm	Purposeful
Time on task/staying on task	Sense of belonging/connectedness	Critical thinking
Study habits/accessing content	Sense of wellbeing	Self-regulation
Developing agency	Desire to do well	Setting learning goals
Attendance	Satisfaction	Operational reasoning
Interaction (peers, teacher, content, technology)	Positive attitude towards learning	Positive self-perceptions and self-efficacy
Attempting	Sees relevance	Integrating ideas
Homework completion	Curiosity	Teaching self and peers
Positive conduct	Interest	Positive perceptions of teacher support
Action/initiation	Vitality/zest	Justifying decisions
Asking teacher or peers for help	Feeling appreciated	Deep learning
Assuming responsibility	Excitement	Focus/concentration
Confidence	Enjoyment	Reflection
Supporting and encouraging peers	Pride	Understanding

Facets of disengagement

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

Technology and student engagement in HE

Research questions

1. How do the studies in the sample ground student engagement and align with theory?

2. Which indicators of cognitive, behavioural and affective engagement were identified in studies where educational technology was used? Which indicators of student disengagement?

3. What are the learning scenarios, modes of delivery and educational technology tools employed in the studies?

METHOD

Systematic review

- Comprehensive search string
- ERIC, Web of Science, Scopus, PsycINFO

Inclusion criteria

- 2007-2016
- Higher education
- English
- Teaching and learning
- Peer reviewed
- Primary, empirical research
- Educational technology
- Student engagement

Search	Screening T&A	Sampling	Screening full text	Quality appraisal	Synthesis
77,508 studies	18,068 studies	4,152 studies	349 studies	349 studies	243 studies

Student engagement

- Almost all studies lacked a definition of student engagement (93%, *n* = 225)
- Evidence of at least one dimension of engagement in 94% (*n* = 229)
  - Behavioural engagement 86%
  - Affective engagement 67%
  - Cognitive engagement 56%

Top five engagement and disengagement indicators

	Engagement Indicators		Disengagement Indicators	
1	Participation/involvement	49%	Frustration	14%
2	Achievement	44%	Opposition/rejection	8%
3	Positive interaction with teachers/peers	41%	Disappointment	7%
4	Enjoyment	23%	Pressured	7%
5	Learning from peers	22%	Worry/anxiety	7%

Technology and (dis)engagement

	TBT	MPT	WCT	KO&S	DAT	DST	AT	SNT	SCT	ML	MOOCs	VirWor	LS	OL	Hardware	Peer eTutors	Games	Sum Engagement
Affective (+)	0.63	0.36	0.15	0.46	0.01	0.01	0.21	0.09	0.06	0.04	0.01	0.06	0.04	0.02	0.08	0.03	0.01	163
Affective (-)	0.56	0.37	0.18	0.49	0	0.01	0.24	0.09	0.1	0.07	0	0.1	0.03	0.03	0.1	0.03	0	68
Behavioural (+)	0.59	0.35	0.11	0.42	0.01	0	0.28	0.08	0.07	0.04	0.01	0.08	0.04	0.04	0.07	0.03	0.01	209
Behavioural (-)	0.58	0.38	0.18	0.4	0	0	0.22	0.18	0.11	0.07	0.02	0.04	0.02	0.02	0.04	0	0	45
Cognitive (+)	0.63	0.38	0.16	0.47	0	0.01	0.2	0.1	0.07	0.05	0.01	0.07	0.05	0.02	0.06	0.03	0	136
Cognitive (-)	0.63	0.33	0.18	0.47	0	0	0.27	0.12	0.04	0.04	0	0.04	0.02	0.04	0.06	0	0	49
overall	0.36	0.43	0.07	0.29	0	0	0.36	0	0	0.07	0	0.21	0.14	0	0.07	0.07	0	14
Sum Tool	138	89	29	104	2	1	65	21	16	10	3	18	9	10	15	8	3	

Fig. 5 Engagement and disengagement by tool typology. *Note.* TBT = text-based tools; MPT = multimodal production tools; WCT = website creation tools; KO&S = knowledge organisation and sharing tools; DAT = data analysis tools; DST = digital storytelling tools; AT = assessment tools; SNT = social networking tools; SCT = synchronous collaboration tools; ML = mobile learning; VW = virtual worlds; LS = learning software; OL = online learning; A&H = Arts & Humanities; BA&L = Business, Administration and Law; EDU = Education; EM&C = Engineering, Manufacturing & Construction; H&W = Health & Welfare; ICT = Information & Communication Technologies; ID = interdisciplinary; NS,M&S = Natural Science, Mathematics & Statistics; NS = Not specified; SoS = Social Sciences, Journalism & Information

Flipped learning and student engagement in K-12

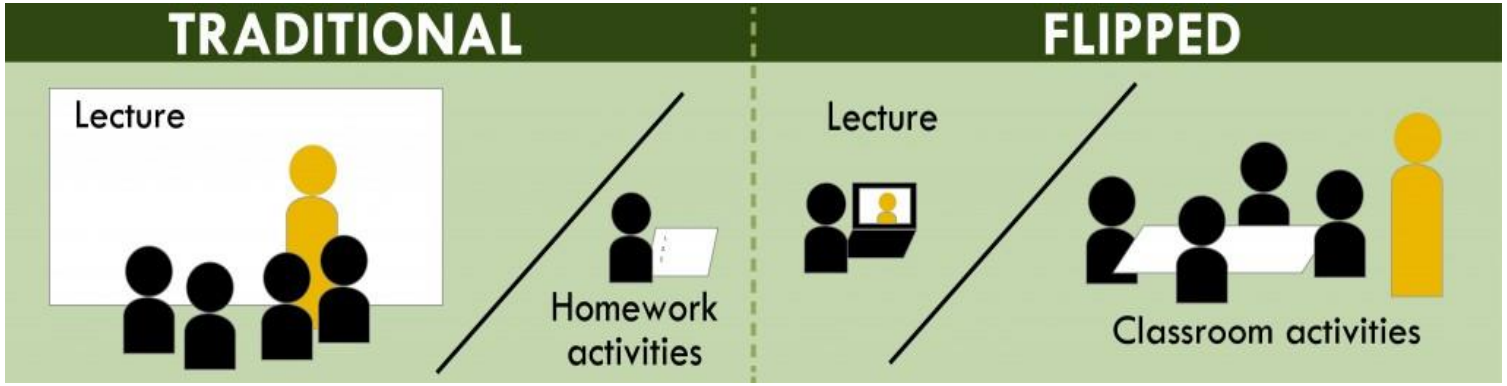
Research questions

1. What are the characteristics (countries, educational settings, participants, subjects, length of studies) of and methods used in research on flipped learning and student engagement in K-12?
2. How is research on flipped learning in K-12 theoretically grounded?
3. Which indicators of student engagement and disengagement are affected as a result of using the flipped learning approach in K-12?
4. What technology has been used in K-12 applications of flipped learning research, and how is it linked to engagement?

What is flipped learning?

A student-centered approach with “great promise”[1]

Flipped Learning is a framework that enables educators to reach every student. The Flipped approach inverts the traditional classroom model by introducing class concepts before class, allowing educators to use class time to guide each student through active, practical, innovative applications of the course principles.[2]



Traditional versus flipped instruction, source: https://www.washington.edu/teaching/topics/engaging-students-in-learning/flipping-the-classroom/

1. OECD (2018, p. 77)
2. Flipped Learning Global Network (2019)

Flipped learning in K-12

METHOD

Systematic review

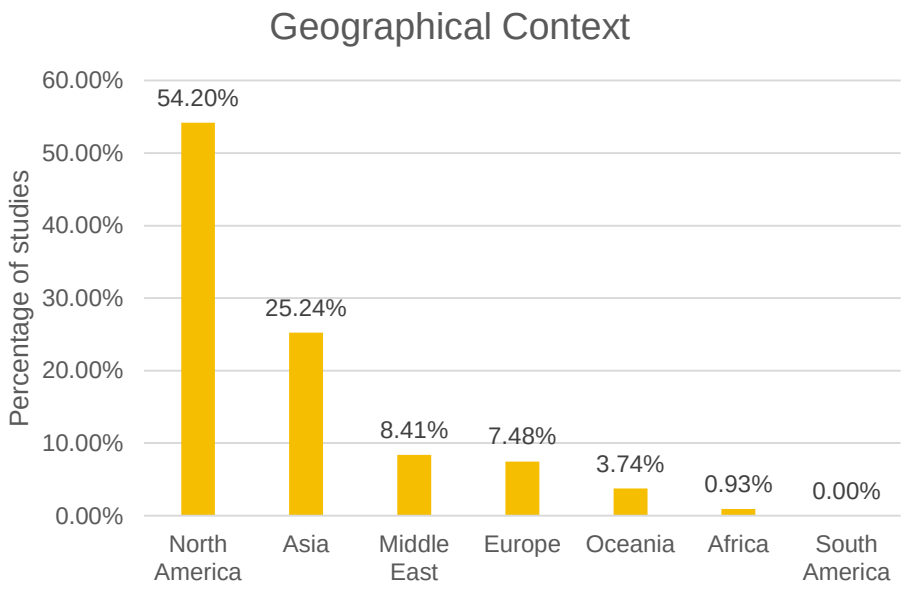
- ERIC, Web of Science, Scopus, PsycINFO, ProQuest, Teacher Reference Center, Education Source

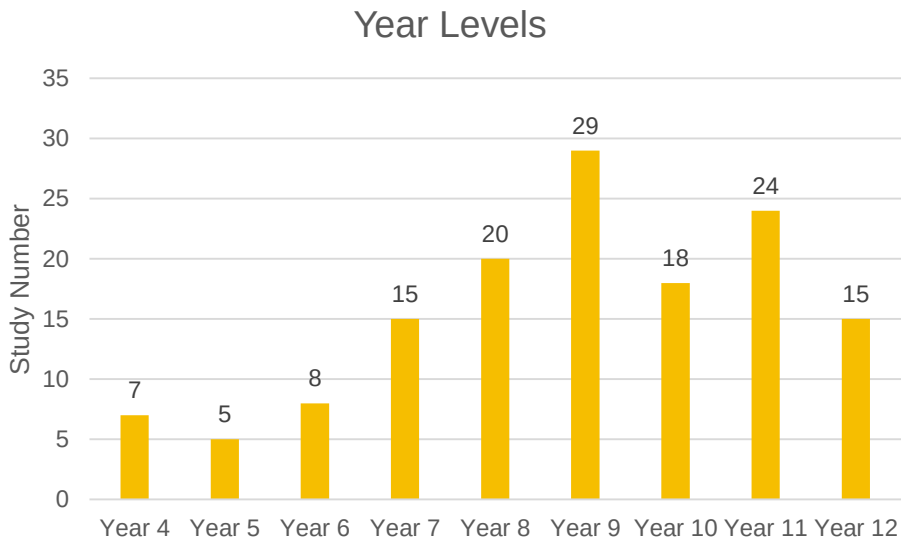
Inclusion criteria

- 2012-2018
- K-12
- English language
- Primary, empirical research
- Flipped learning
- Student engagement

Search	Screening T&A	Screening full text	Data extraction	Quality appraisal	Synthesis
949 studies	760 studies	341 studies	118 studies	118 studies	107 studies

Flipped learning in K-12, 2012-2018





- STEM subjects the most researched.
  - ➢ Maths by far the most popular (38.3%)
- Shorter studies focused on one class only dominated.
- Quantitative (41%), qualitative (30%), mixed methods (29%).
- Videos made by teachers (57.9%), self-assessment quizzes (54.2%) and LMS (51.4%).

Flipped learning and engagement

- Evidence of at least one dimension of engagement in 93% (*n* = 99)
  - Behavioural engagement 81%
  - Affective engagement 74%
  - Cognitive engagement 72%

Top five engagement and disengagement indicators

	Engagement Indicators		Disengagement Indicators	
1	Increased interaction with peers	47%	Task incompletion	21%
2	Enjoyment	39%	Frustration	15%
3	Participation/involvement	36%	Unwillingness	14%
4	Increased interaction with teachers	35%	Confusion	14%
5	Increased confidence	31%	Dislike	13%

Flipped learning, technology and (dis)engagement

	Videos (teacher)	Videos (others)	Videos (?)	You Tube	Khan	LMS	Other LMS	Edmodo	GC	Moodle	Quizzes
	n = 62	*n* = 29	*n* = 20	*n* = 17	*n* = 10	*n* = 55	*n* = 23	*n* = 12	*n* = 10	*n* = 10	*n* = 58
Behavioural Engagement	87%	93%	70%	82%	80%	80%	70%	92%	100%	80%	76%
Affective Engagement	73%	86%	75%	76%	70%	82%	78%	83%	90%	90%	74%
Cognitive Engagement	69%	83%	75%	65%	70%	69%	65%	83%	70%	70%	74%

Note ? = uncertain origin; LMS numbers include those that used named LMS such as Google Classroom; Other LMS = LMS not including Edmodo, Google Classroom or Moodle; GC = Google Classroom

	Videos (teacher)	Videos (others)	Videos (?)	You Tube	Khan	LMS	Other LMS	Edmodo	GC	Moodle	Quizzes
	n = 62	*n* = 29	*n* = 20	*n* = 17	*n* = 10	*n* = 55	*n* = 24	*n* = 12	*n* = 10	*n* = 10	*n* = 58
Behavioural Diseng.	35%	55%	35%	47%	50%	38%	46%	33%	40%	30%	34%
Affective Diseng.	32%	38%	35%	35%	50%	36%	38%	33%	50%	30%	33%
Cognitive Diseng.	27%	45%	25%	24%	30%	33%	42%	17%	30%	40%	28%

Note: Diseng. = disengagement; ? = uncertain origin; LMS numbers include those that used named LMS such as Google Classroom; Other LMS = LMS not including Edmodo, Google Classroom or Moodle; GC = Google Classroom

Online and blended learning in secondary schools during the COVID-19 pandemic

Research questions

1. In what ways did emergency remote education affect motivation and engagement in secondary students?
2. How did research report on emerging online assessment practices in secondary schooling during the pandemic?
3. Are new approaches to peer collaboration emerging and what does this suggest?
4. How did online learning in secondary schools affect parent engagement?
5. What emerging uses of online and blended learning approaches in secondary schools could continue to be implemented going forward?

Online and blended learning during the pandemic

METHOD

Systematic review

This is a systematic review of research, using rigorous methods for identifying evidence, conducting quality appraisal and synthesis: 81 studies met our criteria and were included in the review.

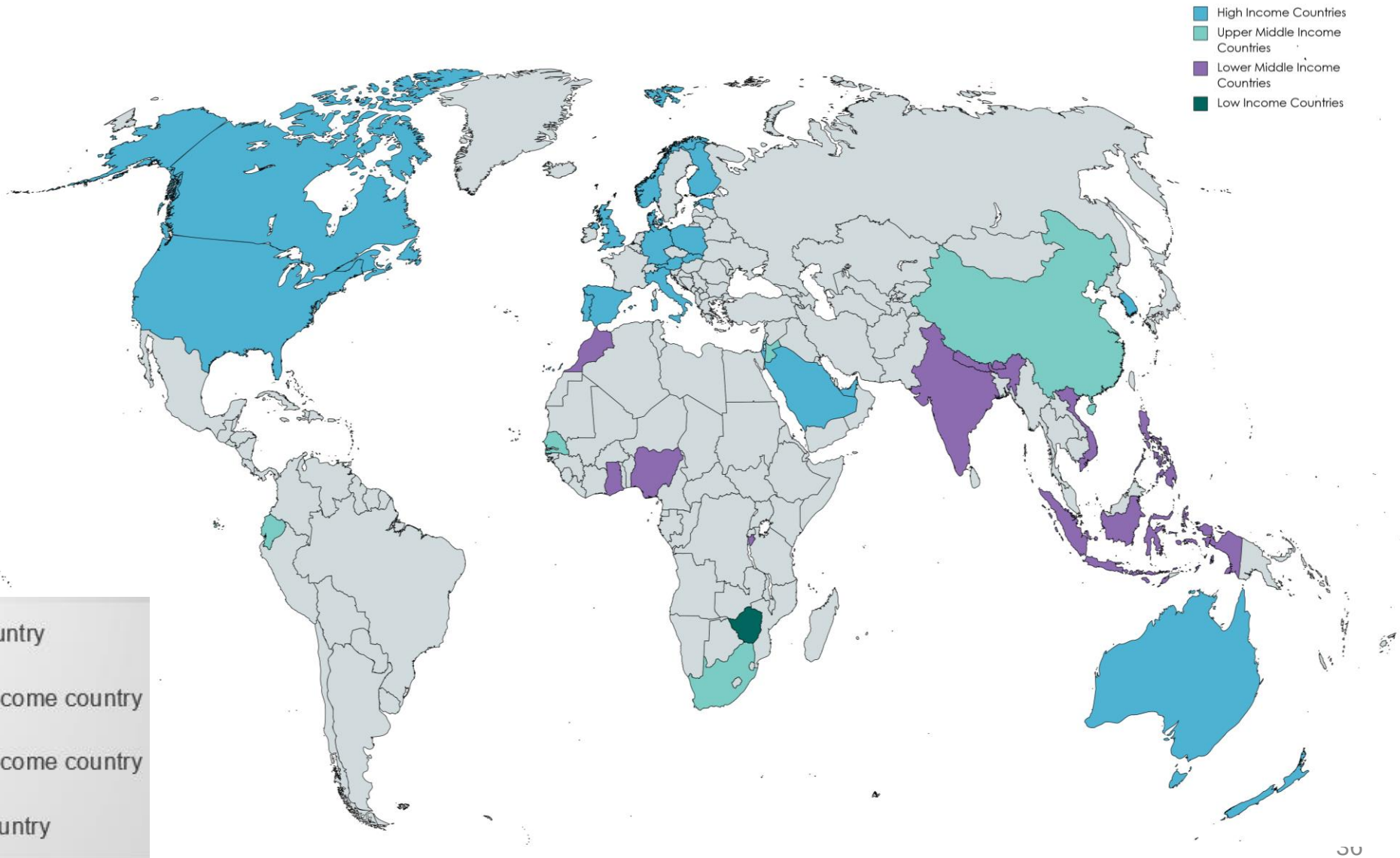
Inclusion criteria

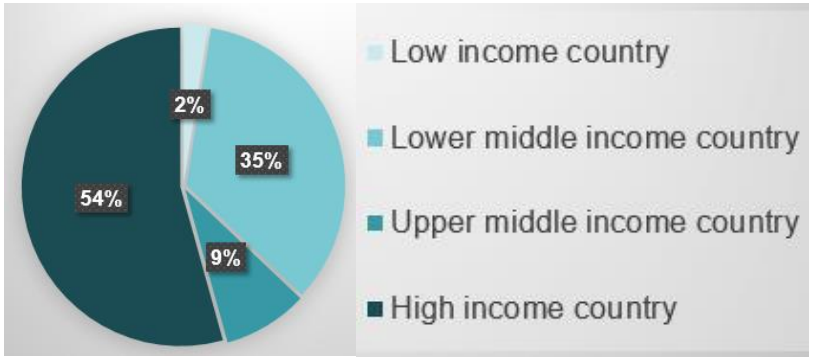
- Secondary school only
- English
- Teaching and learning
- Online or blended learning
- Primary, empirical research
- Undertaken during the pandemic

Search	Screening T&A	Screening full text	Data extraction	Quality appraisal	Synthesis
6,274 studies	5,488 studies	759 studies	129 studies	129 studies	81 studies

Study characteristics

Continent	N	%
Asia	34	42%
Europe	21	26%
North America	12	15%
Africa	5	6%
Middle East	5	6%
Oceania	3	4%
South America	1	1%





Top 5 engagement and disengagement indicators

- Some students were more motivated to learn and complete school work.
  - ➢ Increased ability to study.
  - ➢ Heightened sense of responsibility.
- Some reserved students were found to interact and participate more.

This review

	Engagement Indicators	
1	Heightened self-regulation	26%
2	Understanding of topics/tasks	19%
3	Enjoyment	17%
4	Positive study habits	17%
5	Sense of wellbeing	16%

Top 5 engagement and disengagement indicators

- Emotional and physical distance.
- More instances of behavioural disengagement in studies from high income countries (59%) as opposed to lower middle income countries (29%).
- Having to learn to use new tools, as well as learning online, was quite overwhelming, alongside life load.

This review

	Engagement Indicators	
1	Heightened self-regulation	26%
2	Understanding of topics/tasks	19%
3	Enjoyment	17%
4	Positive study habits	17%
5	Sense of wellbeing	16%

	Disengagement Indicators	
1	Feeling isolated socially	27%
2	Absence from live lessons	19%
3	Confusion	19%
4	Feeling overwhelmed	14%
5	Dislike	12%

Top 5 engagement and disengagement indicators

Flipped learning review pre-pandemic

	Engagement Indicators	
1	Increased interaction with peers	47%
2	Enjoyment	39%
3	Participation/involvement	36%
4	Increased interaction with teachers	35%
5	Increased confidence	31%

	Disengagement Indicators	
1	Task incompletion	21%
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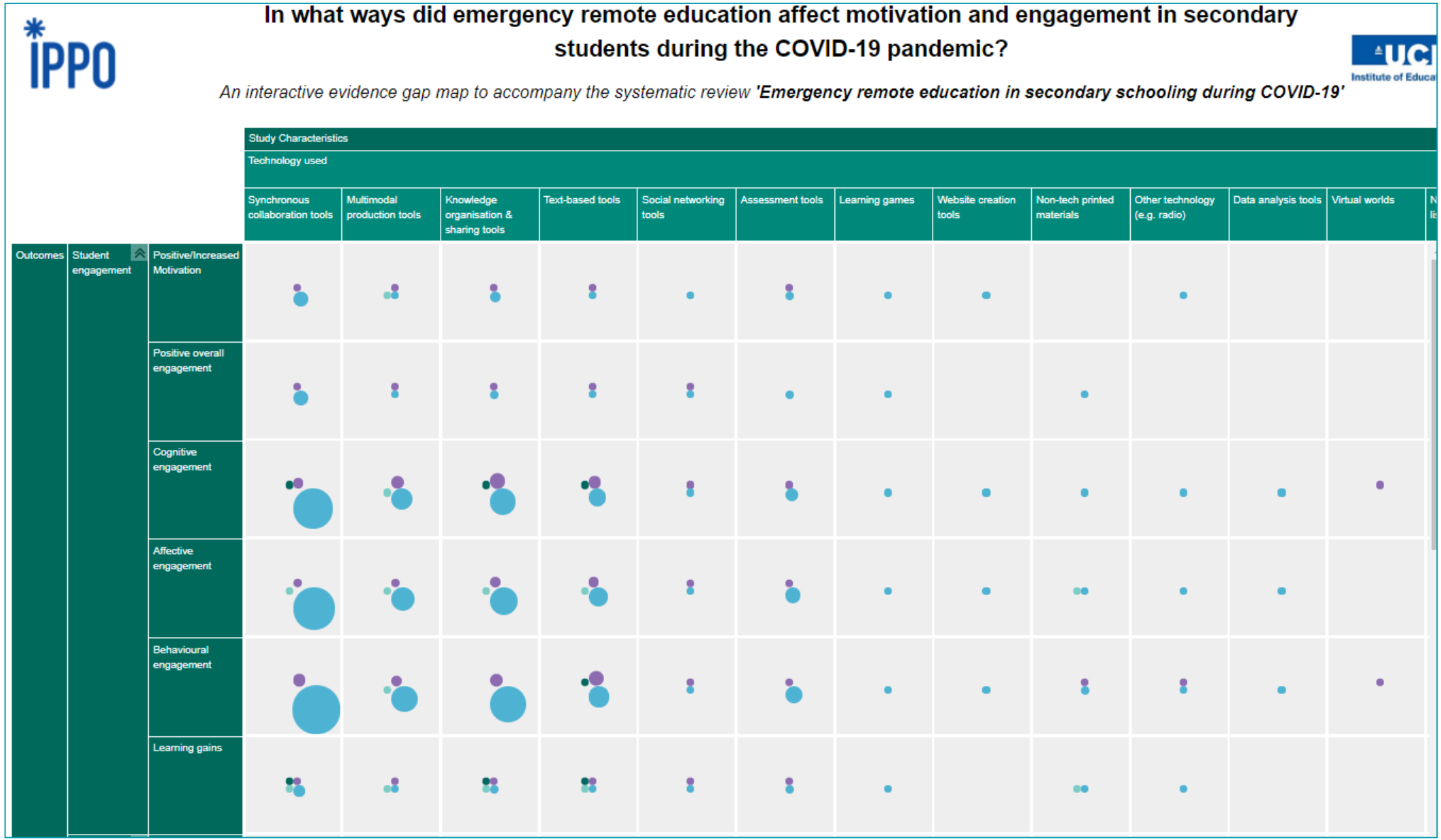
	Disengagement Indicators	
1	Feeling isolated socially	27%
2	Absence from live lessons	19%
3	Confusion	19%
4	Feeling overwhelmed	14%
5	Dislike	12%

Student engagement and disengagement



Interactive EGM Link

Engagement and disengagement

WHAT WAS FOUND ENGAGING?

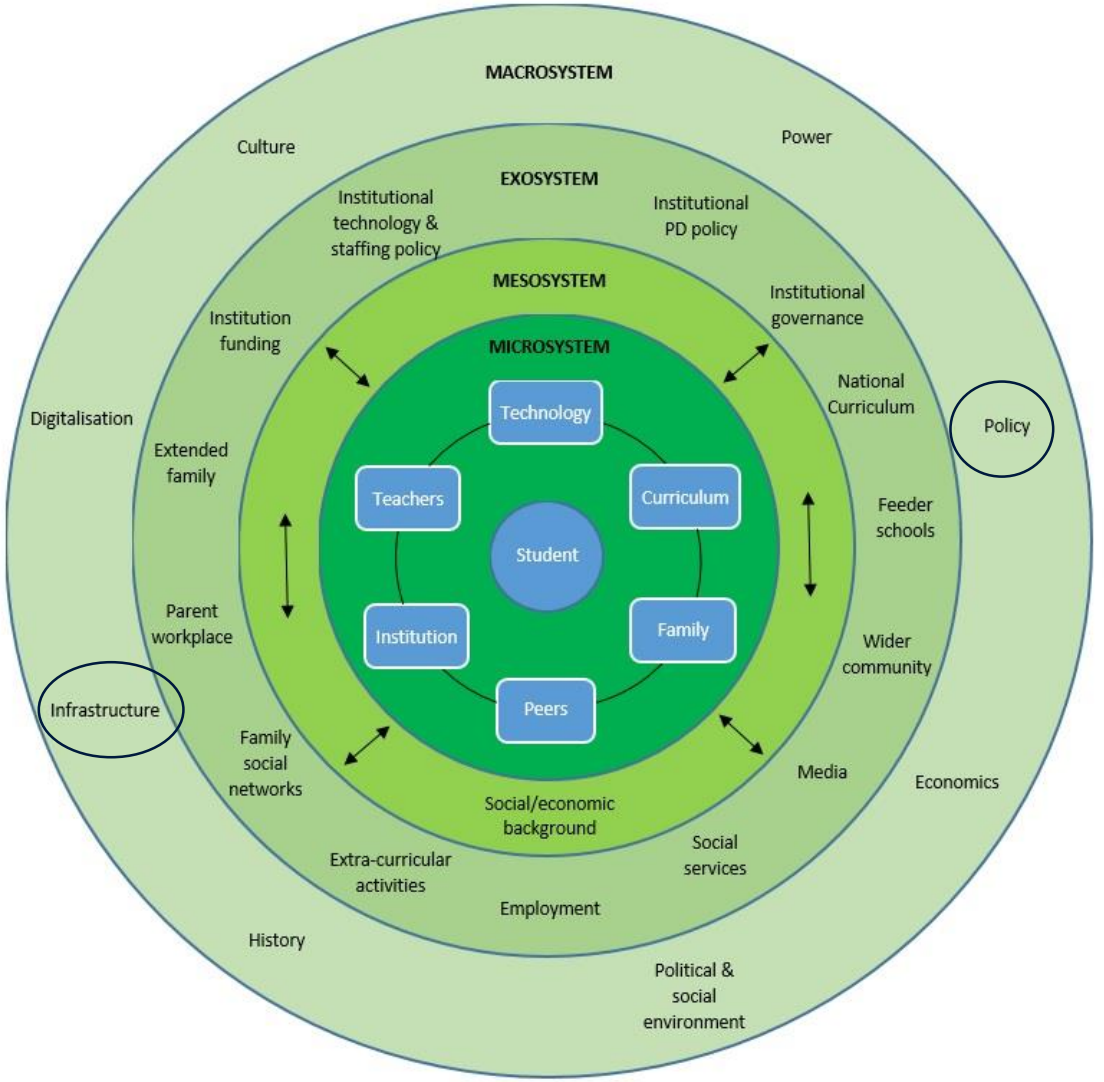
- Assessment tools, especially quizzes
- Learning management systems with collaborative tools
- Breakout rooms with chat for peer interaction and teaching
- Live synchronous lessons including social time
- Teacher-made videos, alongside videos from others

PARTICULAR CHALLENGES

- Lack of student attendance in live lessons
- Decreased opportunities for interaction
- Unexpected changes to the school day
- Fewer opportunities to ask questions
- Written explanations sometimes unclear
- Volume of work assigned by teachers
- Distractions in the home

Implications for practice

Greater awareness of digital divide

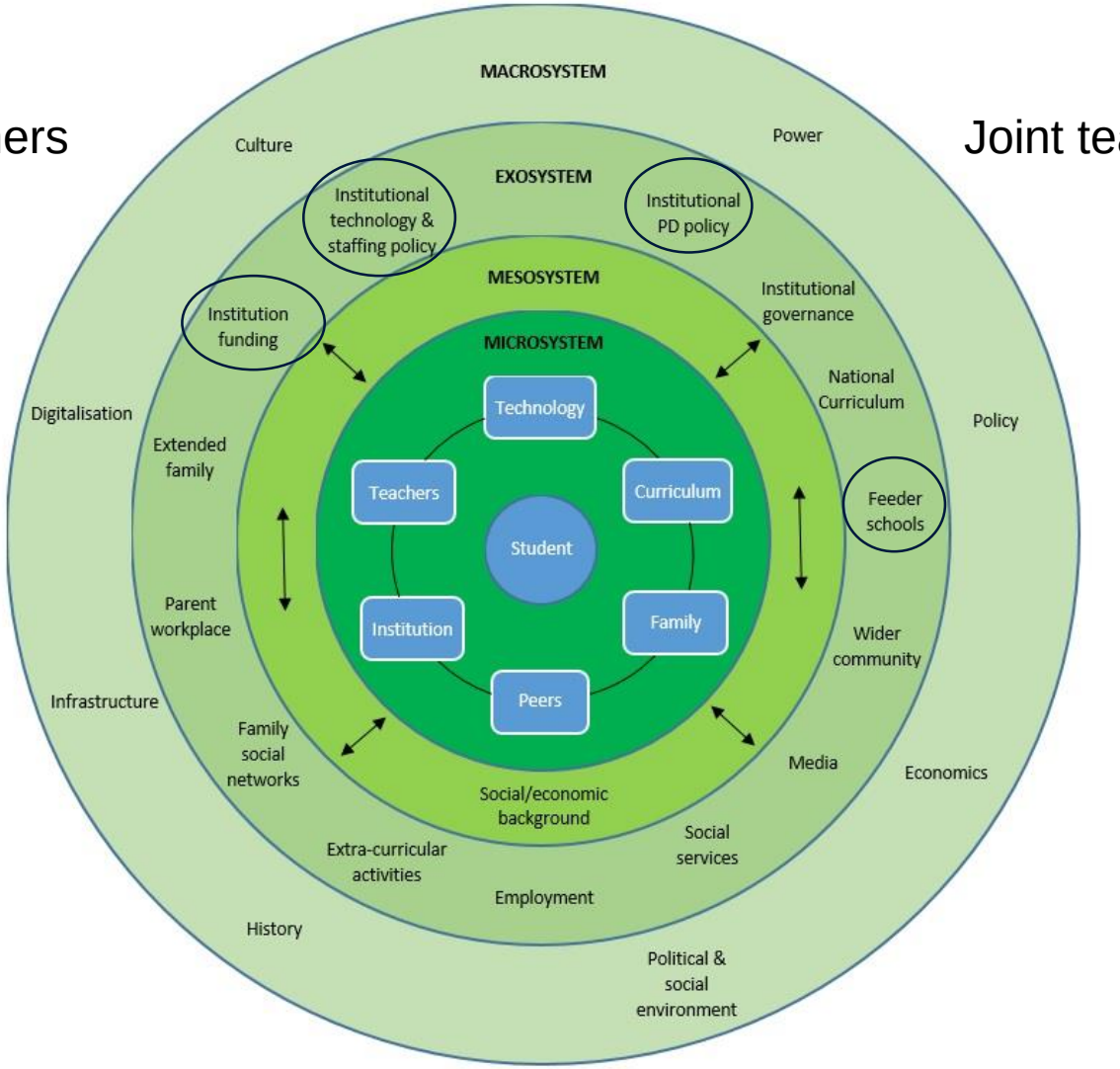


Government policies

- Contact time
- Professional development

Implications for practice

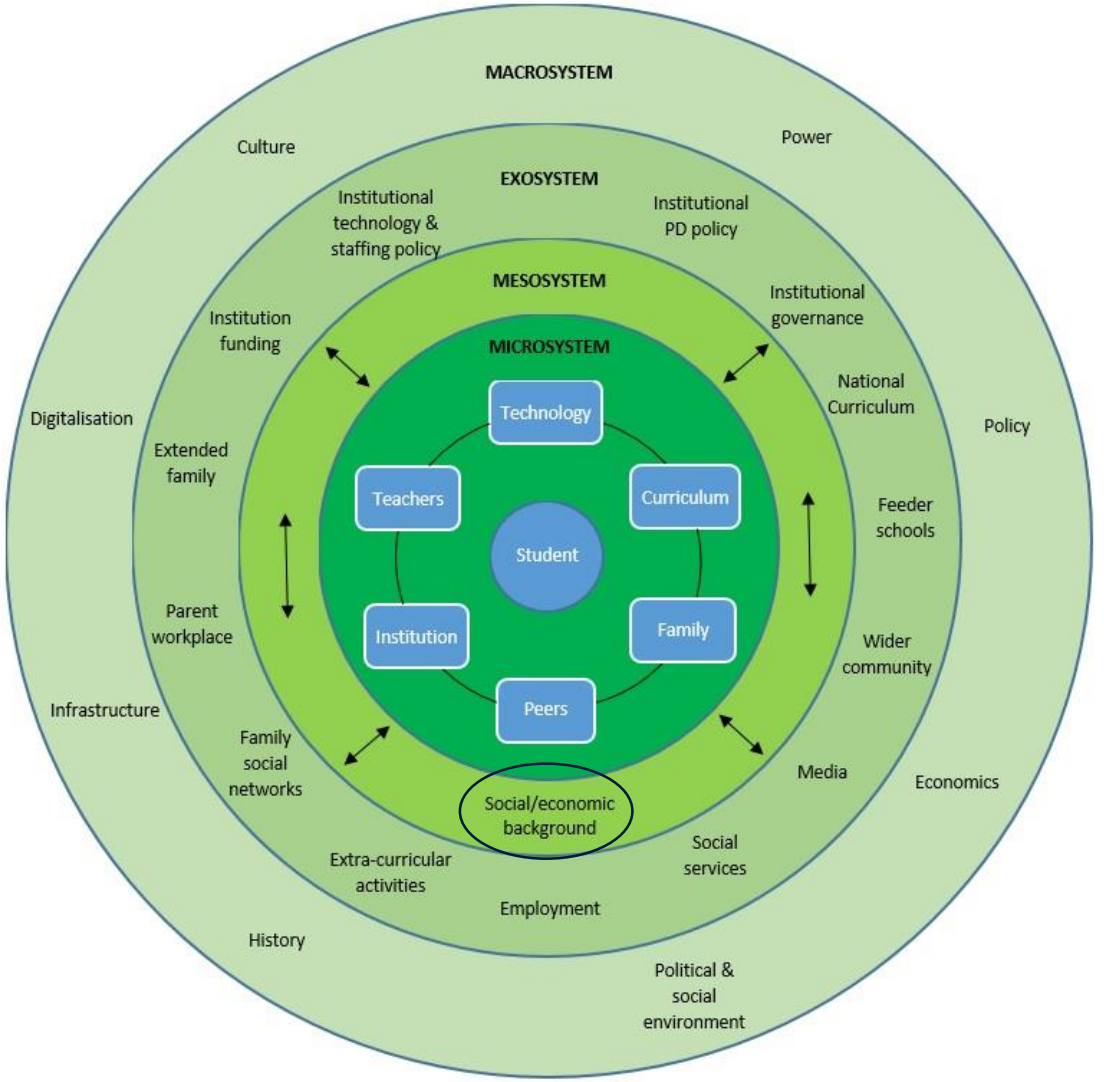
Greater support for teachers



Joint teacher/parent workshops

Consider student knowledge/skills

Implications for practice



- Needs analysis
- Loan equipment
- Multiple methods

Implications for practice

- Teacher PD
- Practitioner research
- Record feedback

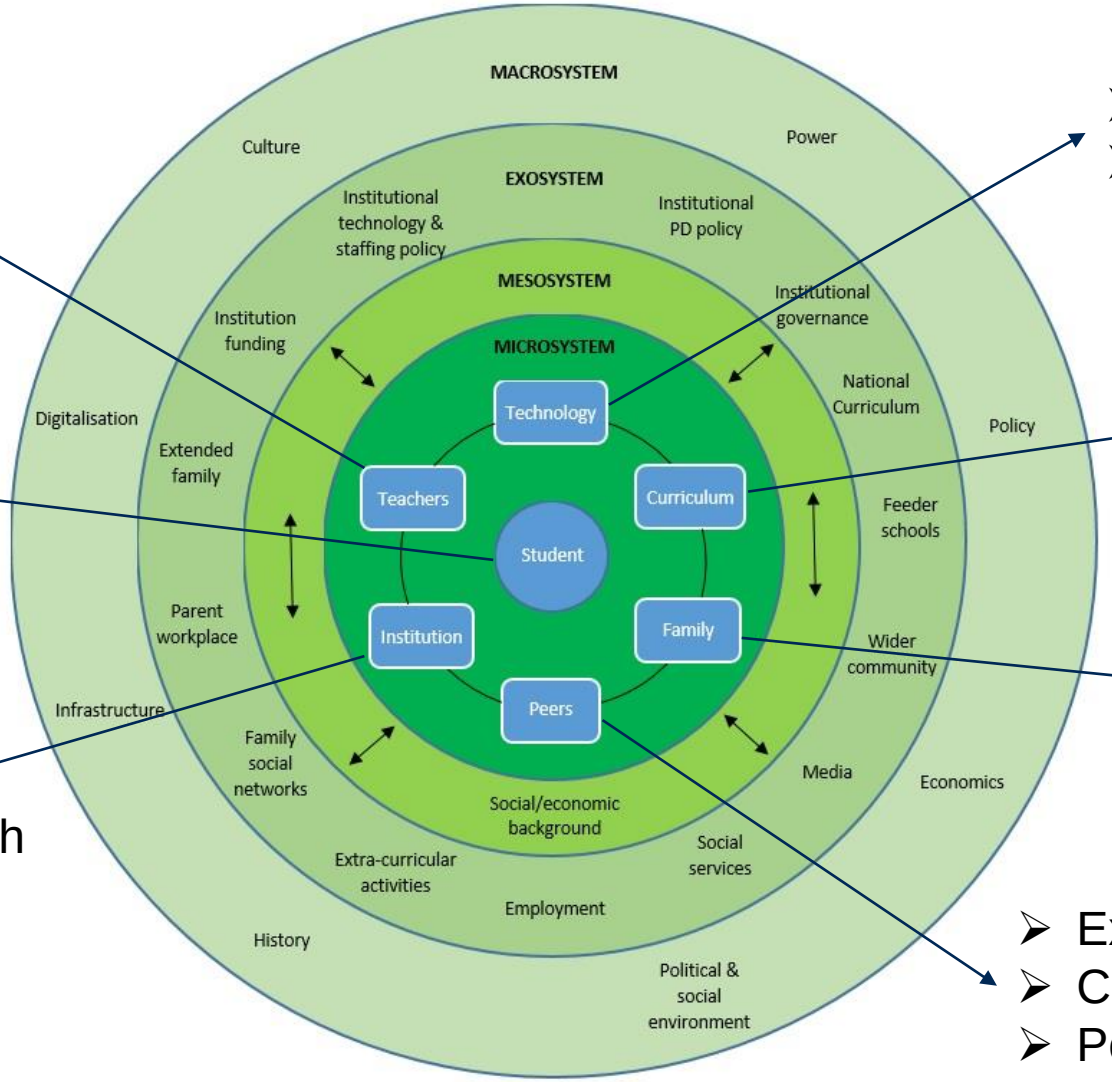
- Collaborative
- Record own videos

- Explicit guidance
- Induction period
- Scaffold routine
- Self-assessment

- Align videos
- Embed quizzes
- Differentiation

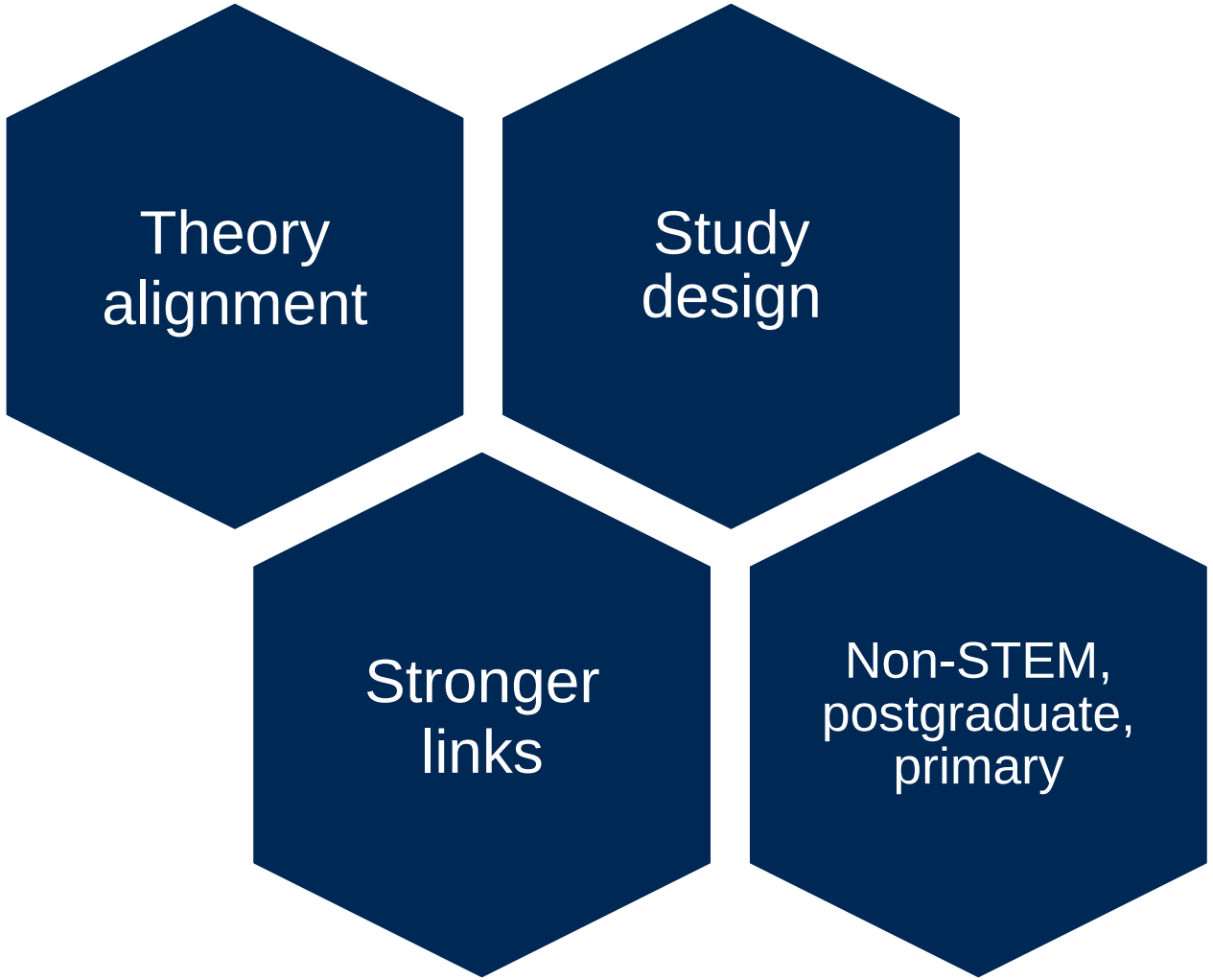
- Push notifications
- Whole institution approach

- PD in blended/online learning
- Encourage to watch



- Explicit instruction needed
- Co-create resources
- Peer assessment

Implications for research



Questions to ponder

1. Based on your experiences, is there anything in the framework that you think is missing?

2. What were the most influential factors on student engagement during the pandemic for your students?
   - What changes did you make in response, if any?

3. What changes do you think are needed to pre- and in-service teacher training, in regards to digital technology?

4. How would you use this framework and the engagement/disengagement indicators, to inform your teaching and/or research?

Further information

- Mapping the field of emergency remote teaching in higher education due to COVID-19
- Schools and emergency remote education during the COVID-19 pandemic – information and interactive evidence gap maps.
- Schools and ERE during the COVID-19 pandemic – rapid review article.
- Further information about the IPPO systematic review project.
- Interactive web database of included studies in the IPPO project.
- EPPI-Reviewer homepage – sign up to a free one month trial.
- EPPI-Mapper information – includes links to example maps.
- EPPI-Mapper app
- EPPI-Reviewer instructional video on interactive evidence gap maps.
- EPPI-Reviewer instructional video on how to create an EGM using EPPI-Mapper.
- Information about using Microsoft Academic Graph within EPPI-Reviewer.

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