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Part 3. Supporting and engaging learners through evidence-based data

3.1. Student engagement

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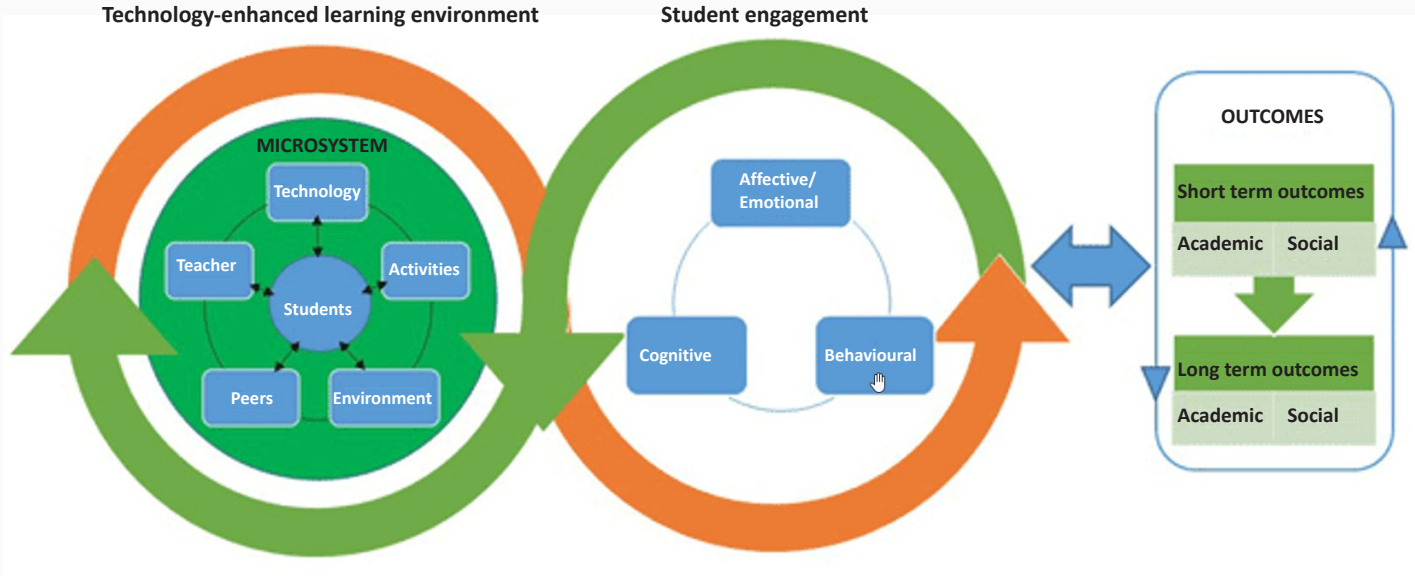
Engagement framework

"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**."
(Bond & Bedenlier, 2019, p.2)



Student engagement framework (p.8)

Bond, M., & Bedenlier, S. (2019). Facilitating student engagement through educational technology: Towards a conceptual framework. *Journal of Interactive Media in Education, (1)*, 1–14. https://doi.org/10.5334/jime.528

Indicators of student engagement

(Bond & Bedenlier, 2019, p.3)

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

Bond, M., & Bedenlier, S. (2019). Facilitating student engagement through educational technology: Towards a conceptual framework. *Journal of Interactive Media in Education, (1)*, 1–14. https://doi.org/10.5334/jime.528

Engagement & (active) learning activities

The ICAP Framework: Linking cognitive engagement to active learning outcomes

	PASSIVE *Receiving*	**ACTIVE *Manipulating***	**CONSTRUCTIVE *Generating***	**INTERACTIVE *Dialoguing***
LISTENING to a lecture	Listening without doing anything else but oriented toward instruction	Repeating or rehearsing; Copying solution steps; Taking verbatim notes	Reflecting out-loud; Drawing concept maps; Asking questions	Defending and arguing a position in dyads or small group
READING a text	Reading entire text passages silently/aloud without doing anything else	Underlining or highlighting; Summarizing by copy-and-delete	Self-explaining; Integrating across texts; Taking notes in one's own words	Asking and answering comprehension questions with a partner
OBSERVING a video	Watching the video without doing anything else	Manipulating the tape by pausing, playing, fast-forward, rewind	Explaining concepts in the video; Comparing and contrasting to prior knowledge or other materials	Debating with a peer about the justifications; Discussing similarities & differences

Examples of Learning Activities by Mode of Engagement from Chi & Wylie (2014, p.221)

Chi, M.T.H. & Wylie R. (2014) The ICAP Framework: Linking Cognitive Engagement to Active Learning Outcomes, *Educational Psychologist, 49*(4), 219-243. https://doi.org/10.1080/00461520.2014.965823

Engagement & chronological perspective (example of a course)

Phase	Learner role	Teacher role	Weeks	Process
1	Newcomer	Social negotiator	1-2	Instructor provides **activities that are interactive** and that help learners get to know one another. Instructor expresses expectations for engagement in the course, provides orientation to the course, and keeps learners on track. Examples: **icebreakers, individual introductions, discussions** concerning community issues such as Netiquette rules in a virtual lounge.
2	Cooperator	Structural engineer	3-4	Instructor forms **dyads of learners** and provides activities that require **critical thinking, reflection, and sharing of ideas**. Examples: **Peer reviews, activity critiques**.
3	Collaborator	Facilitator	5-6	Instructor provides activities that require **small groups to collaborate, solve problems, reflect on experiences**. Examples: c**ontent discussions, role playing, debates, jigsaws**.
4	Initiator / partner	Community member / challenger	7-16	Activities are **learner-designed or learner-led**. Discussions begin to go not only where the instructor intends but also where the learners direct them to go. Examples: **Group presentations and projects, learner-facilitated discussions**.

Adapted from: Conrad, R. M., & Donaldson, J. A. (2011). Engaging the online learner: Activities and resources for creative instruction (Vol. 38). John Wiley & Sons. (p.9)

Learner engagement data

- promoting *learners' active* and creative *engagement with a subject matter*
- using *DT within pedagogical strategies* that *foster transversal skills, deep thinking* and creative expression
- opening up learning to new, real-world contexts, which involve *learners themselves in hands-on activities, scientific investigation or complex problem solving*

Digital technologies (DT)

foster learners' active engagement

provide the opportunity to observe, measure, and understand learning and assess engagement

- log data (e.g. clicking behavior, responding to quizzes in learning environment)
- contributions of students (e.g. forums, blogs, etc. for qualitative analysis)
- audiovisual data (e.g. observations, computer vision techniques)
- physiological data (e.g. emotional responses in students)

Measuring engagement

EODLW
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Traditional measurement approaches

- self-report questionnaires
- experience-sampling methods (ESM) (Csikszentmihalyi and Larson, 1987)
- day reconstruction (Kahneman et al., 2004), and
- interviews (Turner and Meyer, 2000)
- Observational methods

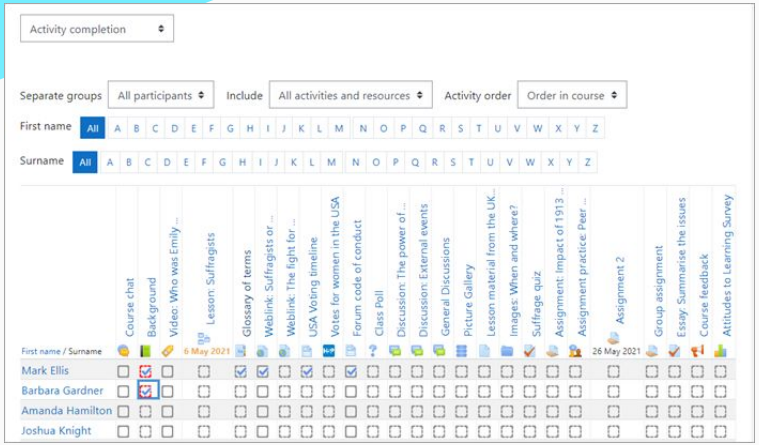
Automated digital measurement approach

- **adduced from academic and behaviour records, such as homework completion, absences, achievement test scores, time spent on a digital learning platform, and so on**.

- advanced and experimental: eye-tracking, haptic tech, sensor (facial features, body moments, and interaction patterns)

Adapted from D'Mello (2021).

Within the automated we may distinguish preconfigured ways (like Reports and Modules in Moodle, but also functionalities like Grades), and configurable ways like quizzes of other type of activities.



Moodle (built-in) Activity completion report
https://docs.moodle.org/400/en/Activity_completion_report

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D'Mello, S. (2021). Improving student engagement in and with digital learning technologies. In *Digital Education Outlook 2021. Pushing the frontiers with artificial intelligence, blockchain and robots* (pp. 75-104). OECD Publishing. https://doi.org/10.1787/589b283f-en

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Techniques & examples to promote engagement

Activity	Monitoring based on evidence	Action/Techniques
Forum	Contributions: number, participants, quality	Direct intervention (teacher): encourage participation, motivate students (make explicit the relevance of participation)
Assignment	Pre-configured by the LMS: Activity Completion of. Moodle report (activity completion)	Reminder of pending task (system) and offer support (teacher).
e-Portfolio	activity e-Portfolio - reflexion (SRL) - **evidence: addition of artifact (learning activity output)**	Teacher intervention at monitoring stage - Graph/automatisme
Case study	Moodle adaptive learning	Automatic assignment of CS based on quiz results
Preventing drop-out	Students at risk of dropping out model in Moodle	Send message to the student based on data report