

**CLANED<sup>®</sup>**

Inside the mind of a learner

# - Sampling experiences to enhance learning process



## INTRODUCTION

*Optimal experiences feed optimal performance.*

Research has demonstrated that engaging students in the learning process makes learning more effective. Engagement increases students' attention and focus, motivates them to practice higher-level critical thinking skills, and promotes meaningful learning. Nonetheless, the high level of drop out rates in online courses indicate that this is not often easily accomplished. Especially now that more and more learning is taking place on the web, the problem of engagement is eagerly waiting to be solved.

Learning was for a long time perceived as a purely cognitive activity. Focus on emotional experiences is a rather recent development in educational research [1]. The experience of the student may not even seem important. However, the way a student experiences a course is likely to have consequences for commitment to studying and on the results of the learning process. Optimal experiences feed optimal performance.

The most intensive learning experiences are usually reported while working in small groups or alone, for example in a library, while traditional lectures are often experienced as tedious and undemanding [2, 3]. The active role of the learner is important. In addition, teachers rarely have access to data about how students experience courses or particular learning materials. Once the students are given a task are they confident that their skills are up to the challenge? Or do they find it too hard to grasp? If some find it easy and others demanding, who are the ones in need of support?

In traditional face to face courses the teacher can, to some degree, perceive the students' engagement directly. Do they look eager to hear more, are they taking notes or are they even awake? When students don't understand a particular part of a lecture, they can raise their hands and ask. On online courses the role of the teacher is different. These can be challenging for many students. The bar for admitting ignorance or asking a stupid question in public is high. In the worst case, the material is deemed unintelligible, but the teacher has no information about this. By including tools for following students' experiences in CLANED®, we can offer both the teacher and the students ways to improve the learning process based on real time data.

*“Enjoyment appears at the boundary between boredom and anxiety, when the challenges are just balanced with the person’s capacity to act.”*

### Mihaly Csikszentmihalyi

The best experiences in learning include a complete absorption in the present moment. Sudden clearness in the midst of a challenging process, when everything runs smoothly. Mihaly Csikszentmihalyi describes this kind of mental stage as flow [4], an activity during which, a person single mindedly works towards a goal. These optimal experiences represent times at which the main reason for pursuing an activity is the sheer enjoyment of the activity itself. How could we make learning in online courses be more like this?

The conditions for entering flow include: (1) perceived challenges of the task at hand that are relatively high and in balance with one’s perceived skills; (2) clear proximal goals that are regarded as important; (3) immediate feedback indicating one’s success at meeting these goals; and (4) highly focused, rather than divided or scattered, attention. Although it is not possible for students to experience flow constantly, it is possible to adjust the course setting to promote the student’s experience favorably for optimal learning.

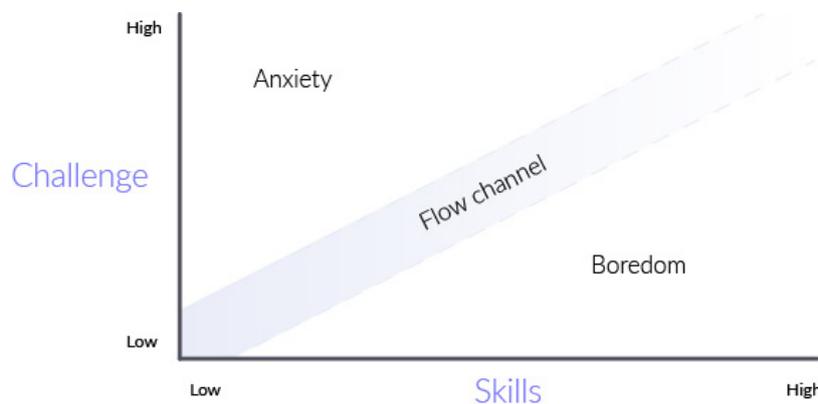


Figure 1. Flow as the balance between skills and challenges. After Csikszentmihalyi [5].

When in flow, the individual operates at full capacity. Intense and focused concentration helps to use mental resources at maximal level. Entering flow depends on establishing a balance between the challenge and experienced competence. As shown in Figure 1, the problem lies on the fragility of this balance. If challenges exceed skills, one first becomes alert and then anxious. If skills exceed challenge, one first relaxes and eventually becomes bored. Although optimal balance between skills and challenge is favorable, it seems that difficult tasks are more advantageous than undemanding ones [6]. Situations in which the challenge is slightly too high, are better for concentration.

The flow state is intrinsically rewarding and leads the individual to seek to replicate these experiences. And although the actual flow experiences might be scarce, they are likely to increase long term engagement [7]. As students master challenges in an activity, they develop greater levels of competence and the activity ceases to be as involving as before. To continue experiencing flow, they must engage in more complex challenges. To engage students with different skill levels in continued enjoyment as their expertise grows, the teacher should have an idea about what the students are going through.

*As a teacher on an online course, it is hard to grasp:*

- *Is a particular theme or an article too hard or self-evident?*
- *Do some students need scaffolding on a particular subject?*
- *Would a group of students benefit from extra curricular activities?*

An effective learning environment as described by Biggs and Tang [8] is one in which “Students should be required to build on what they already know, to be relevantly active, to receive formative feedback and to be engaged in monitoring and reflecting on their own learning”. In other words, students should be engaged, challenged and given adequate support to use high level processing of the learning material. This definition emphasizes the importance of meeting the needs of various learners with different amounts of prior knowledge and different self-regulation skills.

Online courses may be problematic for both the students and the teachers. A recent review of massive open online courses (MOOCs) [9] found out that nearly 90 % of students starting MOOCs drop out due to lack of motivation or engagement, having insufficient prior knowledge about the topic or experiencing the assignments and materials as ambiguous. Fortunately the situation is probably less complicated in an online course, which is part of a degree program in higher education. The students are a predetermined group, with a more homogenous background and similar levels of prior knowledge. A review by Hart [10] revealed the reasons for withdrawing from online courses as difficulties in assessing resources and little or no prior knowledge about a topic. These reviews point out that in an online environment, the optimal way of supporting the learning process has yet to be found.

The relationship between the learner and the learning environment should be constructive. That is, learning materials and tasks should encourage the student to work at the upper limits of his or her skills, and to use resources effectively to achieve tasks. This can be achieved by giving the student adequate support at the right times. The determining factor is to balance the level of support to the needs of the learner [11]. A high level of support is suitable for a student who is unfamiliar with a particular theme. On the other hand, a student with more prior knowledge can prosper in a more open setting. Optimally structured and balanced support keeps the interaction of the student and the learning environment constructive, and thus helps the student to engage in a meaningful learning process.

On an online course, following discussion boards may not give a full picture of the needs and difficulties students face. Those active in writing produce a lot of messages and thus set the tone for the discussion. For example, if a particular theme is experienced as hard by only a few students, but those have active discussions about it, the experiences of the majority get muffled as they are discussed more rarely.

In CLANED®, the students are asked how they experienced particular learning materials, such as an article, video or exercise. This is done using effortless and straightforward queries. When we combine this data with the information of how much time students spend on learning materials, we can offer the teacher real-time information about which themes in the course have been easy and which themes have been experienced as difficult. This information can be presented concerning specific materials, partitions of the course and divided into student subgroups. Different learning materials are automatically and reliably combined to themes using algorithms in CLANED®. As a consequence, it is easy for the teacher to perceive which group of students would benefit from support on a particular theme. Therefore the given support is more likely to meet the needs of the students.

*Measuring activities and experiences enables feedback to the student:*

- *What are my strengths and weaknesses as a learner?*
- *How am I spending my study time at CLANED®?*
- *How could I use my time more effectively?*

In addition to showing data about the students' experiences to the teacher, CLANED® will also offer feedback to the learner. This is similar to the quantified self movement, which has been possible due to the development of activity sensors and other self-tracking measurements. Getting to 10,000 steps every day, monitoring sleep quality or receiving reminders to stand up between long sessions of sitting may help to improve life quality. Seeing one's own data visualized on a screen can be a powerful motivator.

Using self-measurements to make the learning process more effective must be done carefully. Feeding data about activity and experiences to the learner can benefit the learner and help to surpass earlier habits and conventions. However, merely showing the data to the learner without carefully considering what and how should be presented could decrease the learner's motivation if not done correctly. We do not want to discourage someone into thinking they are a second-class learner. Instead, the goal is to encourage students to use successful strategies.

An effective learner is a self-regulated one. According to Pintrich [12], self-regulated learners: (1) set goals and plan learning activities; (2) monitor and control time use, awareness and the needed effort; (3) adapt the learning process and use appropriate strategies; and (4) reflect and evaluate the process when it is done. Data visualisations in CLANED® are designed to help the students accomplish more effective learning practices.

Our goal in CLANED® is to scaffold and enhance the learning process. We strive to help the student adopt learning habits, which make learning more effective. We use validated learning orientation measurements [13-15] to give the students feedback about their learning profiles, i.e. how they usually act in learning situations. Based on these we can give individualised suggestions and study tips for learners. For example a student with a strong, deep motivation, in other words a habit of trying to understand the subject extensively, might sometimes benefit from being more strategic and focusing on accomplishing a task instead of trying to grasp the foundations fully.

Secondly, we use data collected while working at the learning environment to give the student a picture of what is happening. In order to do this, three kinds of data is collected: the student's responses to how challenging particular learning materials are, time spent at CLANED® and what themes the student is focusing on. The goal is to give the student an idea of when and how she could use the learning materials more effectively based on his or her current goals and past activities.

In addition to feeding the actual data back to the learner, we strive to help the student plan his or her studies better. We develop components, which include short- and long-term goal setting, as well as time management planning and evaluation. The idea is that instead of trying to spend as much time as possible trying to memorize content, it is more effective to use focused learning intervals in order to accomplish pre-set goals. In terms of flow-theory, well-defined bursts with clear goals and a possibility to get immediate feedback are essential for optimal learning experiences.

The data is not only used for individual feedback, but also to give suggestions for collaboration and to bring learners together. The data will help to bring together students with similar interests, but different strengths. This enables stimulating group work for every participant.

#### MEASURING ACTIVITIES AND EXPERIENCES

- *CLANED® uses validated measurement tools to enhance the learning process.*
- *All data being collected is used to help teachers and learners.*
- *Measurements and visualizations are based on the best available research evidence.*

CLANED® measures students' experiences and activities in three different ways: (1) learning orientations are measured with validated questionnaires; (2) students' experiences of learning activities are measured by short queries regarding the challenge and competence related to each learning material; and (3) students' activities, such as time use and themes of the learning materials are recorded and analyzed while working in the learning environment.

As explained in the previous chapter, all data is used to help the teacher and the students enhance the learning process. The data is collected solely for this purpose and is not used for marketing purposes.

Validated learning orientation measurements are used to give the learner feedback about his or her learning habits [13-15]. These are offered when the student is not focusing on a specific material. Feedback for the student is offered after the questionnaire.

Although we want to ask the student how he or she experiences learning, we also want to minimize interruptions while focusing on learning. Short queries concerning the learning activities are placed at the end of each section, and include two Likert-scale items, which range from 1 to 7: "Challenges of the activity" and "Skills in the activity". These two questions have been discovered to expose important information about the learning process [6, 7]. This kind of experience sampling takes only a few seconds and does not disrupt learning unnecessarily. It also reduces the time between the experience and answering a question, and allows to sample a broad range of variables relating to different learning settings [16].

Developing and implementing the used measurements is an iterative process. CLANED® uses instruments based on the best available research information. Measurements and their usability are improved continuously.

## SUMMARY

- *CLANED® uses validated measurement tools to enhance the learning process.*
- *Measuring activities and experiences enables feedback to the student.*
- *Data is used to help the teacher design effective settings for learning.*

## REFERENCES

- [1] R. Pekrun, T. Goetz, W. Titz and R. P. Perry, "Academic Emotions in Students' Self-Regulated Learning and Achievement: A Program of Qualitative and Quantitative Research," *Educational Psychologist*, vol. 37, pp. 91-105, 2002.
- [2] D. Shernoff J., M. Csikszentmihalyi, B. Schneider and E. Shernoff Steele, "Student Engagement in High School Classrooms from the Perspective of Flow Theory," *School Psychology Quarterly*, vol. 18, pp. 158-176, 2003.
- [3] S. E. Peterson and J. A. Miller, "Comparing the quality of students' experiences during cooperative learning and large-group instruction," *The Journal of Educational Research*, vol. 97, pp. 123-134, 2004.
- [4] M. Csikszentmihalyi, *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Collins Publishers, 1996.
- [5] M. Csikszentmihalyi, *Flow: The Psychology of Optimal Experience*. New York: Harper & Row, 1990.
- [6] G. B. Moneta and M. Csikszentmihalyi, "Models of concentration in natural environments: A comparative approach based on streams of experiential data," *Social Behavior and Personality*, vol. 27, pp. 603-638, 1999.
- [7] J. Nakamura and M. Csikszentmihalyi, "Flow theory and research," in *Handbook of Positive Psychology*, C. Snyder R. and S. J. Lopez, Eds. Oxford: Oxford University Press, 2009, pp. 89-105.
- [8] J. B. Biggs and C. S. Tang, *Teaching for Quality Learning at University*. Maidenhead: Open University Press, 2011.
- [9] K. F. Hew and W. S. Cheung, "Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges," *Educational Research Review*, vol. 12, pp. 45-58, 2014.
- [10] C. Hart, "Factors associated with student persistence in an online program of study: a review of the literature," *Journal of Interactive Online Learning*, vol. 11, pp. 19-42, 2012.
- [11] J. D. Vermunt, J. Elen and R. E. Clark, "Balancing support for student learning," in *Handling Complexity in Learning Environments*, J. Elen and R. E. Clark, Eds. Bingley, UK: Emerald Group Publishing, 2006, pp. 167-184.
- [12] P. R. Pintrich, "A conceptual framework for assessing motivation and self-regulated learning in college students," *Educational Psychology Review*, vol. 16, pp. 385-407, 2004.
- [13] K. Lonka, P. Sharafi, K. Karlgren, I. Masiello, J. Nieminen, G. Birgegard and A. Josephson, "MED NORD--A tool for measuring medical students' well-being and study orientations," *Med. Teach.*, vol. 30, pp. 72-79, 2008.
- [14] N. Entwistle, V. McCune and J. Hounsell, "Investigating ways of enhancing university teaching-learning environments: Measuring students' approaches to studying and perceptions of teaching," *Powerful Learning Environments: Unravelling Basic Components and Dimensions*, pp. 89-107, 2003.
- [15] A. Parpala and S. Lindblom-Ylänne, "Using a research instrument for developing quality at the university," *Quality in Higher Education*, vol. 18, pp. 313-328, 2012.
- [16] L. F. Barrett and D. J. Barrett, "An introduction to computerized experience sampling in psychology," *Social Sciences Computer Review.*, vol. 19, pp. 175-185, 2001.

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