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Promoting Self-Regulated Learning and 21st-century skills with Task-Centered Microlearning

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Introduction

Our instructional methods should promote skills that are required for K12 students career's mobility as grownups. These skills, often referred to as 21st-century skills, include self-regulated learning, critical thinking, collaboration, and more. The need for SRL was intensified during COVID-19 worldwide spread, which drove school systems to online-learning and required students to learn by themselves..

Purpose of Study

This study aims to explore the potential of the **Task-centered Microlearning instructional strategy** to promote self-regulated learning and 21st century skills
The research questions are: (1) Which SRL skills are promoted through Task-Centered Microlearning? And how? (2) Which other 21st-century skills are promoted through Task-Centered Microlearning?

Self-Regulated Learning

Self-Regulated Learning (SRL) is the ability of the learner to self-regulate his thoughts, motivations, cognition, and behavior towards learning independently and attaining his learning goals.
One of the enablers of SRL is the ability of the student to understand and control his learning environments. Pre-recorded video lectures can facilitate such control.

Microlearning

Microlearning is a set of small (5-8 min of length) pre-recorded learning videos targeting small learning objectives. Each video unit (microunit) contains short-term activity (microtask), such as Q&A's or quizzes.
Figure 1 below presents how a classic lecturing unit can be disassembled into microunits..
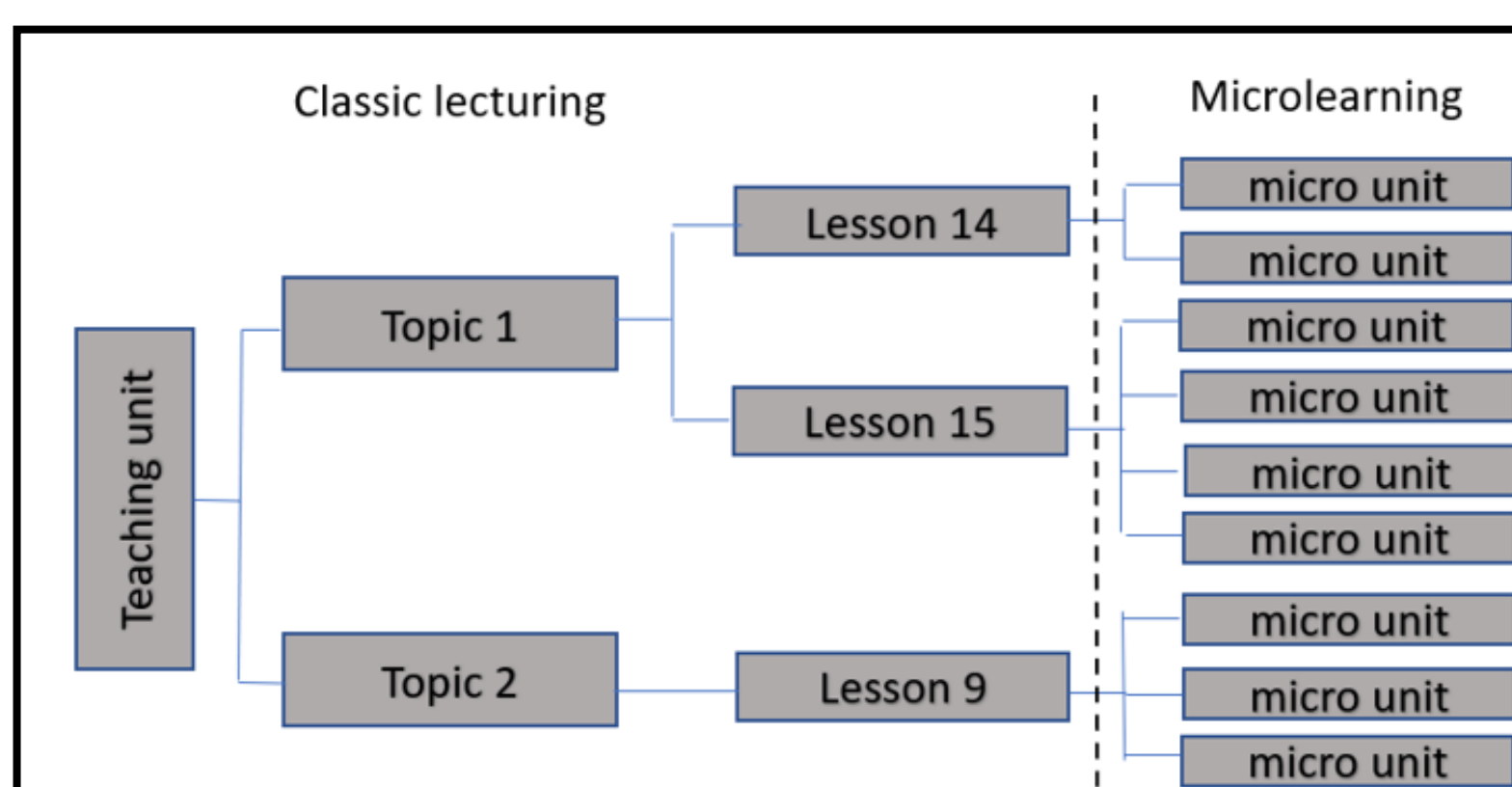

Figure 1. Source: Žufić, J. (2015). Micro-Learning and EduPsy LMS

Microlearning may reduce some of the cognitive load involved as the units are structured in learner-paced segments.

An Organizing Task

Since a single microunit covers only a fragment of a subject or concept, the student needs to relate between sets of microunits and put them into the appropriate context. An organizing task may help the student cognitively assemble different learning units and engage him in the learning activity by providing meaning and motivation.

Blended learning

Blended learning combines online educational materials, teacher-student online interaction and traditional classroom methods. **The Task-centered Microlearning instructional strategy** cab be applied for blended learning: it fits both remote and face-to-face learning.

Method

This pilot research included four science teachers and 23 8th grade students from one middle school. The participants signed a consent form approved by the institutional ethics committee.
The program lasted four weeks. During the first week, the teacher explained the program's collective task (building a digital escape room), introduced three digital tools for the digital game creation, and exposed the microlearning platform. During the following three weeks, the students individually learned environmental concepts by **watching 18 microunits** and completing the **unit's microtasks**. In parallel, the students, working in teams, developed a digital escape room (**organizing task**). The final week was devoted to the projects' presentation and a reflection process (see Figure 2).
The teacher has a fundamental role in the task-centered microlearning framework: He conducts timely interventions and facilitation to monitor the student's progress, provide feedback and promotes collaborative sharing of a particular student's obstacle and solution.
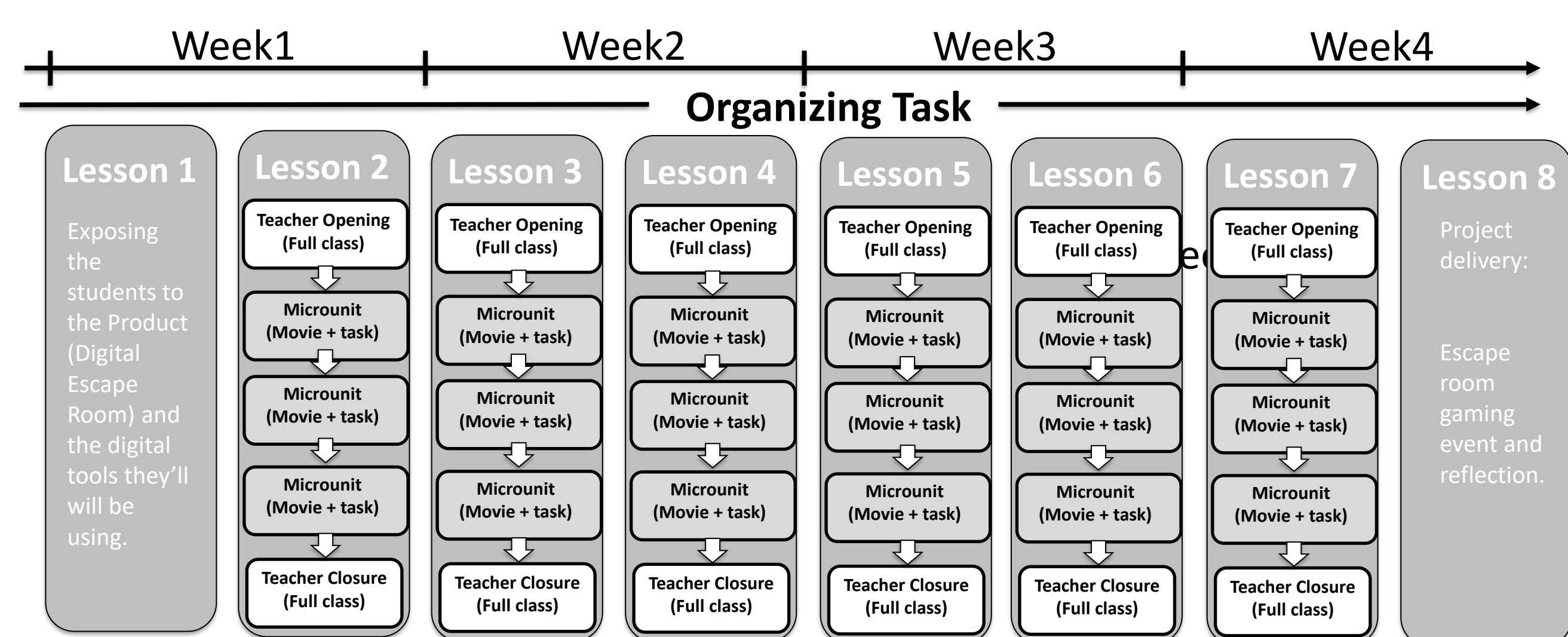

Figure 2. The task-centered microlearning program

We used quantitative and qualitative data research tools to measure students applying aspects of SRL related to controlling their learning environment and managing time/goals. We used open-ended questionnaire to collect aspects of SRL that the students were applying while facing obstacles during the program. In addition, we collected qualitative data regarding applying aspects of SRL and other 21st-century skills by interviewing the teachers.

Results

Preliminary results revealed that the students were practicing one or more aspects of SRL, such as controlling and replaying the videos to ensure self-learning ("I replayed the video over and over again until I understood all of it"), self-balancing between learning and off-learning, and overcoming obstacles by using their colleagues', teacher's, or parent's help.
The students favourably described their ability to control their learning pace, and that their code created a tangible outcome. Quotes: "I can progress independently", "with the short quizzes I was able to evaluate my understanding of each learning concept", "I mostly liked working in a context of actual product". In addition, the students reported the collaborative work contributed to their self-understanding of the learned topic. The teachers reported that the students were actively engaged through self-controlling their microlearning environment, demonstrated ownership of the learning outcomes, and applied the skills: critical thinking, communication, creativity and collaboration,.

Next steps and Discussion

To automatically collect data that relates to the students' control of their learning environment, we plan to use a Learning Management System (LMS) based environment. With the LMS we will collect the student's usage of the video control buttons, partial watching, rate of completion unit's tasks, etc.
We also plan to explore the promotion of additional SRL aspects with this task-centered microlearning framework, such as evaluating personal progress and motivation to learn.
COVID-19 pandemic challenges reshaped the concepts of instructional delivery, place, time and how learners are grouped together. Since the proposed framework fits remote and face-to-face learning, this research may contribute to a worldwide need for effective tools and methodologies for online and blended learning. It may also extend the knowledge about Microlearning applicability in K-12 education.

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