

Research Article

Elisa Repo*, Riia Kivimäki, Niina Kekki and Jenni Alisaari

***“We thought about it together and the solution came to our minds”*: languaging linguistic problem-solving in multilingual Finnish classrooms**

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Abstract: This study examines a learning experiment in which linguistic problem-solving tasks designed to increase students' (aged 9–13) language awareness through collaborative dialogue were introduced in multilingual primary school classrooms in Finland. The aim was to analyse how the students ($N = 126$) reported what was happening during the linguistic problem-solving tasks, drawing on the method of languaging. Additionally, the study investigates how meaningful, relevant and novel the students with diverse backgrounds found the tasks. The data were collected via a survey. Students' problem-solving reports were analysed via content analysis, with the Taxonomy of Cognitive Process applied. Statistical analysis was used to measure the experienced meaningfulness, relevance and novelty. The analysis resulted in an understanding of the multiple voices in which the students articulated their thinking regarding linguistic problem-solving. The study sheds light on how to develop language aware learning materials to engage all students, regardless of their backgrounds, in discussions on language.

Keywords: language awareness; language learning; languaging; linguistic problem-solving; multilingual learners

***Corresponding author: Elisa Repo**, Department of Teacher Education, University of Turku, Turku, Finland; and Johannes-Gutenberg University of Mainz, Mainz, Germany, E-mail: elisa.repo@utu.fi
Riia Kivimäki, Department of Teacher Education, University of Turku, Turku, Finland
Niina Kekki, Finnish Language and Finno-Ugric Languages, University of Turku, Turku, Finland; and Department of Teacher Education, University of Turku, Rauma, Finland
Jenni Alisaari, Department of Teacher Education, University of Turku, Turku, Finland; and INVEST Research Flagship Center, University of Turku, Turku, Finland

1 Introduction

For centuries, textbooks and teaching materials have been among the most dominant tools for facilitating students' learning (Guerrettaz et al. 2021; Karvonen et al. 2017). The way learning materials are designed is important, as they are motivators for students' participation, thereby affecting the pedagogic dialogue (Tainio 2012) and—at their best—promote conceptual change (Mikkilä-Erdmann 2001). To promote language learning, materials should provide opportunities for language negotiation in interactions (Aalto et al. 2009; Guerrettaz 2021; van Lier 2000). In the field of learning material studies, research is available on the content of materials, but students' roles as material users and participants in learning tasks have been largely overlooked (Guerrettaz 2021; Guerrettaz and Johnston 2013; Karvonen et al. 2017; Tomlinson and Masuhara 2018).

This study considered a learning experiment for primary-level textbook development, focussing on how materials shape classroom activity from the students' point of view (cf. Guerrettaz 2021). More specifically, it exemplifies an attempt to engage students in meaningful collaborative dialogue in the school context by giving the participants linguistic problems to solve. Linguistic problem-solving refers to classroom tasks that involve analysing linguistic features and should generate “episodes of dialogue where students discuss language they are observing or producing, question their language use, or correct themselves or others” (Swain and Lapkin 1998, p. 326). Thus, while solving problems, students are opportune to negotiate language interactively and, in turn, share and recycle linguistic resources into affordances (cf. Dufva 2013; Lantolf and Thorne 2006; van Lier 2000).

When developing new learning materials, it is vital to understand schooling as a linguistic process, as language is the medium through which students' access learning and display knowledge (Cummins 2000). In the Finnish context, where this study was conducted, the National Core Curricula for primary-level education (Finnish National Agency of Education 2014) has been reformed to promote language awareness as a key value guiding the development of school culture. At the practical level, however, there is concern about whether teachers can implement the curriculum requirements (Zilliacus et al. 2017). Explicit language awareness in textbooks and learning materials appears scarce (Satokangas 2020), and recent research has suggested that teachers' expertise in language aware pedagogies develops slowly (Repo 2020; Tarnanen and Palviainen 2018) and not self-evidently (Alisaari et al. 2019; Harju-Autti and Sinkkonen 2020). It seems that, no matter how progressive education policies are, their implementation is never one-way and top-down (Hornberger and Johnson 2007). Therefore, providing teachers with adequate learning materials could support the establishment of language

aware pedagogies. However, according to a review of studies on the effects of raising language awareness in classrooms, further research is necessary from a task-based perspective on language learning (Garton and Graves 2014; Guerretaz et al. 2021; Sierens et al. 2018; Tomlinson 2012).

The learning experiment in this study introduced linguistic problem-solving tasks intended to increase students' language awareness in multilingual primary school classrooms in Finland. That is, the students were asked to solve five tasks collaboratively, during which they analysed linguistic features and negotiated language interactively (see more about the content of the tasks in Section 3). To develop learning materials that better facilitate students' learning, the aim was to outline, categorise and critically analyse how linguistic problem-solving tasks are encountered in multilingual classrooms. This was examined from two perspectives: First, the students' reports on the experiment were investigated drawing on the languaging method (Swain and Watanabe 2013), and the typical reports from students with diverse backgrounds on the linguistic problem-solving strategies used during the tasks were described (RQ 1). Second, students' engagement in the experiment was examined from their viewpoint by considering the students' reports concerning the meaningfulness, relevance and novelty of the tasks (RQ 2). The research questions of the study are as follows:

1. What are the characteristics of students' reports on their problem-solving strategies when participating in linguistic problem-solving tasks?
2. How meaningful, relevant or novel do students with diverse backgrounds experience the tasks?

Due to the non-recurrent data collection process, the study could not examine the actual changes that occurred regarding students' language awareness. However, research at all levels of schooling has indicated that students learn and retain more when they have agency in the process and are given opportunities to speak, listen, interact, reflect and be active (Johnson and Johnson 2005; Udvari-Solner 2012). Further, similar results have been suggested concerning motivation and autonomy (Benson 2007; Ushioda 2003). This article aims to advance the field, through a) obtaining understanding of how multilingual classrooms operate when materials with linguistic problem-solving tasks are used, b) providing insights into opportunities for bridging language learning with students' existing language awareness and c) offering information on how to design materials to be more engaging.

2 Linguaging as the theoretical framework of the study

The theoretical framework of this study focuses on languaging. This framework was applied for problem-solving in collaborative dialogue and by collecting and analysing the data. Languaging is based on a sociocultural understanding of language learning—and learning in general—as a social and cognitive process (Lantolf and Thorne 2006; Vygotsky 1962, 1986). In interactional sociolinguistics, linguistic ethnography and sociolinguistics of globalisation, languaging generally means ‘a practice of using language to make a meaning’ or ‘learning languages and their actual use’ (Blommaert 2010; Madsen et al. 2016; Phipps 2006). However, this study applies a twofold definition of languaging by Swain and Watanabe (2013): i) languaging occurs when a person confronts a complex problem and speaks with another person about the problem and how to solve it (interpersonal communication); and ii) languaging is verbalising the problem-solving strategies, i.e. talking with or writing to oneself to privately mediate the cognitive process (intrapersonal communication). Compared with interactional sociolinguistics, how the study used the term languaging as intrapersonal communication could also be defined as ‘meta-languaging’ (Madsen and Nørreby 2019), whereas languaging as interpersonal communication could be positioned closer to the definition of languaging as a practice with language users employing whatever linguistic features are at their disposal (Madsen et al. 2016). Emphatically, the twofold definition of languaging exists in the Finnish language. While languaging could be translated as ‘*kieleily*’ when it refers to the interpersonal communication that occurred during the learning experiment and involved collaborative dialogue, it could be translated as ‘*kielentäminen*’ after the learning experiment, when it, as intrapersonal communication, occurred to collect and analyse the data.

Languaging as interpersonal communication relates to activities in which the participants constantly share and recycle language or linguistic resources while ‘doing things in language, through language, and with language’ (Dufva 2013, p. 64). In the learning experiment of this study, the students entered a joint cognitive workspace created through discussion to conduct linguistic tasks that they were instructed to solve together with a peer (Dillenbourg 1999). More precisely, the students were divided into interactive groups, which—besides activating students’ individual cognition—were supposed to generate extra activities (such as explanation, disagreement and mutual regulation), which would trigger extra cognitive mechanisms (such as knowledge elicitation, internalisation and reduced cognitive load) (Dillenbourg 1999). The purpose was for the students, regardless of their linguistic abilities, to mutually support and provide scaffolding for one another

by drawing on everyone's linguistic resources (Cummins 2001; Walqui and van Lier 2010). Together with their physical and social surroundings, such language exchanges enable students to notice and adopt new aspects of language that can be used for interaction (van Lier 2000). These can be referred to as affordances, which have been argued by van Lier (2004) to be the first level of language awareness. In the broadest sense, collaborative dialogue encourages the simultaneous use of multiple languages (including the students' home languages) to solve the tasks (cf. Garcia 2009).

Languaging as intrapersonal communication also applies Vygotsky's (1962, 1986) insights into the intertwined relationship of language and thinking; language is a cognitive tool, 'one of the most important mediating tools of the mind' (Swain 2006, p. 95). Therefore, by asking students to report their problem-solving strategies in their own words (either spoken or written), it is possible to reveal their metalinguistic and conceptual awareness levels and to provide explanations for their performances (Rättyä 2017; Swain 2006). Indeed, languaging has been used as a data collection tool in some recent subject didactics studies in Finland (Joutsenlahti and Kulju 2015; Rättyä 2017; Rättyä and Kulju 2018).

3 Content of the learning experiment: collaborative linguistic problem-solving tasks

The learning experiment in this study strove to respond to the shortage of concrete examples of how to implement language aware pedagogies with collaborative linguistic problem-solving tasks. The definition of language awareness covers various fields (Komorowska 2014), but it generally means understanding how languages work and how people learn and use language (Association for Language Awareness [ALA] 2020). This study focused primarily on the *knowledge about language* and *metalinguistic awareness* components of the definition of language awareness (cf. ALA 2020; Lilja et al. 2017). Metalinguistic awareness is explicit knowledge about the phonological, morphological, lexical, syntactic and pragmatic features of a language (Roehr and Gánem-Gutiérrez 2009) and a set of cognitive skills that allows language users to verbalise these linguistic features (Alderson et al. 1997; Elder et al. 1999).

Previously, tasks in language learning materials have often been mechanical and encouraged memorisation (Rättyä 2017). However, supporting the learning of students with linguistically diverse backgrounds requires more inclusive, collaborative and exploratory materials (Aalto and Kauppinen 2011). In this study, to engage the students in a meaningful collaborative dialogue, their perspectives

on the meaningfulness, relevance and novelty of the task were central to the material development. These experiences were expected to happen through, for instance, language play, which can be defined similarly to play in general: ‘Like fiction, play is a kind of carnival reality, parallel to the real world but having its own meanings’ (Cook 1997, p. 227). In the dialogues that the experiment was trying to create, the language play, riddles and semantic triggers in jokes were to belong to everyone, not only to the native Finnish-speaking students (cf. Swain 2006). Furthermore, the language of play can be repetitive, artificial, removed from reality and focused upon the play, even for linguistic features (Cook 2000), which was the intention of the exercise in this study.

The study tasks were designed as part of a primary-level learning material development project funded by the Finnish National Agency for Education. The project aimed to publish an open access textbook (Alisaari et al. 2020) comprising exercises covering the different components of the definition of language awareness (ALA 2020), using contemporary sociocultural language learning theories (García 2009; Lantolf and Thorne 2006; van Lier 2000; Vygotsky 1962, 1986) and the framework for linguistically responsive teaching (Lucas and Villegas 2013) in practice. The authors of this study also participated in the development of the textbook. The textbook comprises exercises during which the students, for instance, negotiate language interactively, learn academic Finnish language and use their multilingual repertoires as a resource in classroom. The exercises chosen for this study are called a *linguistic escape room* and comprise five linguistic tasks. The study only reports the component of material development that is directly relevant to the students’ reports and experiences. Instead of only recognising linguistic categories (e.g. a verb, syllable or vowel), the tasks guided students in peer-to-peer collaborative dialogues (cf. Swain and Watanabe 2013), during which the students refined their language awareness (*evaluated*) or discovered a new understanding of a linguistic phenomenon (*created*) (for Taxonomy of Cognitive Process, see Anderson and Krathwohl 2001). The format for such a language play is borrowed from escape-the-room games, which became popular in Finland (and in many other countries) in the 2010s. The typicality of these games is that the participants solve puzzles and riddles and negotiate solutions collaboratively to find a ‘metaphorical key’ to ‘open a door’ to the next level in the game. The content of the linguistic escape room (tasks i–v), objectives of the dialogue and awareness of the linguistic subsystem involved are presented in Figure 1.

The examples in Figure 1 are in Finnish, as the gibberish is not translatable into English; the point of the task would become lost in translation, as the Finnish language contains fusional agglutinative morphology with complex sequential inflections and frequent stem variations (Hakulinen et al. 2004). For instance, task i (finding verbs in text written in gibberish Finnish) is an instruction on how to

TASK	OBJECTIVES OF THE COLLABORATIVE DIALOGUE TO SOLVE THE TASK	AWARENESS OF LINGUISTIC SUB-SYSTEM	EXAMPLE OF THE TASK
i) Finding verbs in text written in gibberish Finnish 	Solving the task involves A. recognising the genre of the text (an instruction of how to prepare a product called 'möhjö') B. sentence analysis (the gibberish text follows the syntax and morphosyntax of Finnish language) C. awareness of the forms and functions of a predicate in Finnish (cf. Hakulinen et al., 2004: VISK § 868)	Genre, Finnish syntax, and morphosyntax	Näillä nippellä möhjö auvaistuu Kus loudat möhkinää, kihautaa tämä valjuiseen litkeeseen. Saitit köyvät möhjästä nuupperin ja neipit listuvat vellosti. Mantalle möhjö dullaiseksi. Jaffaa, pulitse ja höppää lullalla. Meljissä pullatamme kruuvim möhjän!
ii) Decoding anagrams 	Solving an anagram involves rearranging the letters of a word or phrase in a way that a valid word is produced.	Finnish lexicon	1. Mikä eläin on hihna? 2. Mikä vuorokauden aika on tlla? 3. Mikä taitelijan tarvike on ylöjärvi?
iii) Decoding word transformations 	Solving a word transformation involves A. distinguishing the morae (or syllables) in the beginning of the two words B. interchanging these syllables in a way that a valid word is produced. Such word plays are possible in Finnish due to its extensive inflectional and derivational morphology (cf. Hakulinen et al., 2004: VISK § 14, § 146)	Finnish lexicon and morphology	Tutki sananmuunnoksia. Kuinka ne tehdään? kaikki lelut → leikkikalut 1. pahvikannu 2. Juha maastossa 3. Juttu Kemissä 3. rullasta punoja 4. väistän muurin
iv) Conjugating a verb in gibberish Finnish 	Solving the task involves A. recognising that gibberish Finnish follows the morphological rules of the Finnish language B. awareness of personal congruence of Finnish verbs (cf. Hakulinen et al., 2004: VISK § 1268) C. using analogy for finding the suitable personal suffixes	Finnish morphology	Taivuta jaffata-verbii: 1. Minä _____ 2. Sinä _____ 3. Hän _____ 4. Me _____ 5. Te _____ 6. He _____
v) Reading and answering a message written in a secret language (where all vowels were replaced with i) 	Solving the task involves A. recognising the genre of the text (a short message from another planet – 'Planet i' – requesting help in a situation where the environment of the planet is in danger) B. awareness of vowels in Finnish (cf. Hakulinen et al., 2004: VISK § 2) C. an ability to replace each 'i' in the text with a speech sound in a way that it produces a valid word D. answering the text by applying the logic of an i-language to create a message that has meaning	Genre, Finnish phonology and lexicon	Koululenne on tullut viesti i-planeetalta. Saatko selville, mitä viestissä lukee? 1. Miidin pliniitti in viirissi. 2. Impriisti in viirissi. 3. Hiilimmi pliistti pliniittimmi ilmistin. 4. Viitki iittiii? Haluat kysyä tarkennuksia i-planeetan asukkailta. 1. Oletko yhä vaarassa? 2. Kuinka monta asukasta planeetalla on?

Figure 1: Content of the linguistic escape room the exercise.

prepare an imaginary product called 'möhjö'. The instruction (in a genre of a 'cooking recipe') looks like Finnish (it follows the syntax and morphosyntax of Finnish language), but it is written in nonwords, making everyone in the classroom to some extent 'non-native-speakers' of the language (cf. *Awakening to languages*

by Candelier et al. 2012). As seen in Figure 1, the tasks of the exercise were designed to awaken students' metalinguistic awareness of the linguistic subsystems and guide them to process and/or share their existent language awareness. Recycling linguistic resources in tasks supports students' ability to participate in other linguistic activities later on. In the Finnish language, parts of speech (nouns, verbs, adverbs, etc.) and sentence constituents (subjects, verbs, objects, etc.) are morphologically marked; therefore, an awareness of morphology is essential for understanding the language regarding both syntax and genre. Therefore, morphological and phonological awareness are likely to affect reading comprehension, albeit sometimes indirectly (Good et al. 2001; Lerkkanen et al. 2010; Tighe and Binder 2015). After solving one of the five tasks, collaborating peers advanced to another task until all the tasks were eventually completed and they had 'escaped'. Each time a task was solved, the students got 'a key', i.e. a letter from the teacher, and in the end, the letters formed a word.

Overall, the linguistic escape room exercise aimed at exemplifying how to support the development of students' Finnish language competence towards academic language level, which is important to ensure better educational opportunities after basic education in Finland (Kalalahti et al. 2019). Although the learning material (Alisaari et al. 2020) included exercises in which the students were guided to overcome monolingual norms in the classroom, in this particular exercise, multilingualism explicitly manifests as secret languages and gibberish Finnish (as the students ended up communicating in a- and e-language in addition to i-language and producing a made-up gibberish Finnish). During the experiment, the students were encouraged to use their entire linguistic repertoires as a resource in the joint cognitive workspace. For instance, although the instruction of a task was in Finnish, a student could explain 'the key to the task' and share her/his linguistic awareness with another student in any language the students have in common.

4 Data and methods

The learning experiment was conducted and the data were collected in the fall of 2019 in a multilingual primary school in Southwest Finland. In the study, 126 students (ages 9–13) participated in the linguistic escape room exercise. Additionally, a researcher and a teacher were present during each data collection session. The school was chosen due to the high immigrant concentration (27%) in the area (Statistics Finland 2015). The participating classes were taught by class teachers (i.e. primary school teachers who teach all subjects in grades 1–6 and students aged 7–13). The participating students comprised 4th graders ($n = 45$), 5th graders ($n = 41$) and 6th graders ($n = 40$). Among the participants, there were both

native Finnish-speaking learners (NFLs) ($n = 69$) and multilingual learners (MLLs) ($n = 57$). All MLLs lived at least one whole school year in Finland. Furthermore, both girls ($n = 74$) and boys ($n = 52$) were present.

The study employed the term *MLLs* to refer to multilingual Finnish language learners from immigrant backgrounds. This group comprised students who reported something other than Finnish language as their home language(s), although categorising students' languages into 'home language' and 'academic language' has been criticised (Seltzer 2019). Additionally, it is acknowledged that NFLs are also multilingual and have competences to communicate in different language contexts with all their linguistic resources (for usage-based multilingualism, see Honko and Mustonen 2018). Furthermore, the term NFLs is used for students who reported the Finnish language as their home language, yet recognising how difficult it is to define someone as a 'native' (Eisenclas and Schalley 2020). NFLs could potentially be used to combine language expertise, affiliation and inheritance related to the Finnish language (Leung et al. 1997). However, the realities of multilingual classrooms are more complex than the dichotomy of MLLs and NFLs, as implied in the study.

It is also acknowledged that categorising students as 'multilinguals' and 'natives' (or as 'boys' and 'girls') opposes the current understanding of language- and culture-aware schools (Finnish National Agency of Education 2014). Nevertheless, they are adapted as variables in the study to enable examination of the characteristics and possible differences between the groups, and eventually, to investigate ways of supporting the development of vulnerable students' language competence towards academic level. As international assessments (e.g. PISA) have suggested a significant gap between the learning outcomes of NFLs and MLLs and also between girls and boys (Harju-Luukkainen et al. 2014; Kauppinen and Marjanen 2020; Leino et al. 2018), it seemed reasonable to compare how different student groups (NFLs and MLLs; girls and boys; students from different grades) engaged in linguistic problem-solving tasks.

The data aimed at methodological triangulation, covering qualitative and quantitative survey reports of the students, introduces the form for the survey. The process of data collection and analysis is illustrated briefly in Figure 2 and extensively in Sections 4.1 and 4.2. Generally, languaging as interpersonal communication was used as a method during the experiment (collaborative dialogue), and thereafter, languaging as intrapersonal communication occurred in the form of qualitative data gathering and analysis (analysis of the reported problem-solving strategies).

As presented in Figure 2, the linguistic escape room exercise was conducted in seven multilingual classrooms as part of ordinary school day activities. Each test situation lasted 45–60 min. The researcher played an active role in instructing the

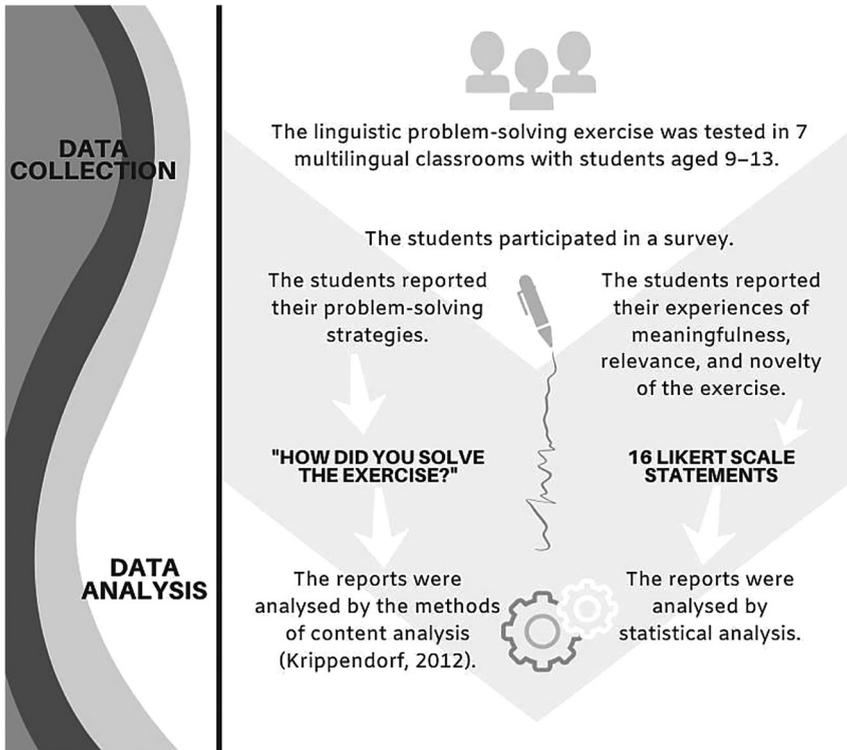


Figure 2: Data collection and analysis.

exercise. During the test sessions, the students solved the escape room tasks collaboratively in random groups of two or three students. All groups completed the tasks. After the testing, the students individually completed a survey investigating 1) the students' reported problem-solving strategies (see Section 4.1) and 2) their perceptions of the meaningfulness, relevance and novelty of the exercise (see Section 4.2). Participation was voluntary, and an ethical review was conducted by the human sciences' ethics committee following the guidelines of the Finnish National Board on Research Integrity TENK before the testing. Thereafter, informed consent for the research was obtained at both the institutional and individual levels to register the data for research use. Participants' privacy rights were respected by anonymising the data, and current legal regulations (General Data Protection Regulations) were followed. All data collection was conducted in Finnish, but the examples have also been translated into English; it is acknowledged that translation is a considerable transformation of a text. The data examples in Finnish will be published in their original form (e.g. without correcting spelling mistakes) in Section 5.

4.1 Qualitative reports of solving linguistic problems

As this study intended to understand students' ways of verbalising during the experiment, the participants were asked to write their answers to the following open-ended question: *How did you solve the exercise?* While the question was designed to be unequivocal and accessible to all participants, it was intended to elicit detailed information about the strategies students' used during collaborative dialogue regarding the escape room tasks. In this regard, the nature of languaging as a method must be acknowledged. Asking the students to verbalise their strategies meant asking them to participate in another act of languaging—the method to grasp the students' languaging was to engage them in a language practice that Madsen and Nørreby (2019) would call 'meta-languaging'. Therefore, as we had multilingual Finnish language learners as participants in the study, the answers were read with developing linguistic competence in mind. That is, spelling mistakes were not strictly considered, but rather the message that an answer tried to carry. Furthermore, the study was executed in mainstream classrooms to guarantee sufficient competence in the Finnish language.

The answers were analysed via content analysis (Krippendorff 2012). First, the data were subjected to initial coding to identify how the students privately reported the strategies they used to solve the linguistic escape room. During the initial data coding, it became evident that the question had elicited reports of students *creating* solutions utilising their previous metalinguistic awareness, *analysing* the exercise in collaboration or *remembering* a solution differently. Thus, the Taxonomy of Cognitive Process (Anderson and Krathwohl 2001) was freely applied while coding the students' reports (analytical categories 1–3), as the six-fold taxonomy is structured as 1) *remembering*, 2) *understanding*, 3) *applying*, 4) *analysing*, 5) *evaluating* and 6) *creating*. Answers with other kinds of strategies were also coded, and then the coded answers were grouped for pattern identification. Thereafter, the identified patterns were examined, and the strategies were read considering different levels of abstraction and socio-cultural language learning theories. Although the taxonomy of cognitive process lacks the collaborative and social aspects of learning (Rättyä 2015), social interaction was considered a strategy while organising the codes. In particular, the analysis focused on finding opportunities for scaffolding and increasing language awareness (Cummins 2001; Walqui and van Lier 2010). Eventually, this heuristic approach led to the identification of the analytical categories shown in Figure 3, which will be described in detail in Section 5.1.

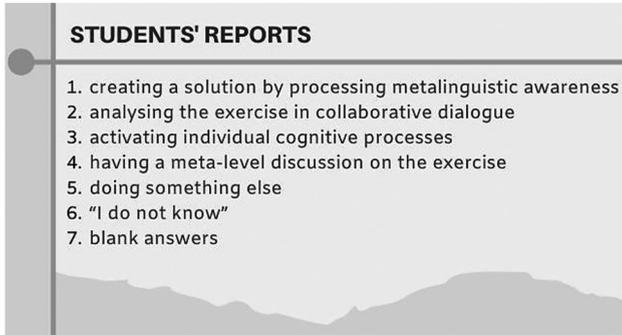


Figure 3: Analytical categories.

Note that while the Taxonomy of Cognitive Process (Anderson and Krathwohl 2001) places *remembering* on the lowest level, this study named the 3rd tier *activating individual cognitive processes*. Using such a category name, the study refers to reports in which the students demonstrated linguistic problem-solving solely as intrapersonal communication, omitting the social aspect of learning.

4.2 Quantitative experiences of meaningfulness, relevance and novelty

Both the qualitative and quantitative parts of the survey started with questions about the participant's background information: a) grade (4th, 5th or 6th), b) gender (girl or boy) and c) home language (NFL or MLL). Thereafter, the quantitative part of the survey included Likert scale (1–5) statements to measure how 1) meaningful, 2) relevant (in terms of learning) and 3) novel the students with diverse backgrounds found the tasks. To examine these experiences, 16 Likert scale items were used to construct three summed variables (Table 1) based on statistical analysis of inter-item correlation and the content. These variables complemented the findings from the qualitative part of the study, outlining a picture of how engaging the students found the escape room tasks.

Considering the Likert scale statements, the surveys were made accessible to students aged 9–13 by asking the participants to circle an emoji representing their opinion. The reliability of the summed variables was evaluated using Cronbach's alpha, and the data were analysed using IBM SPSS version 26.

The summed variables were named according to their content. The items in each summed variable are presented in Section 5.3. First, the *experience of the meaningfulness* of the tasks included items measuring how exciting and joyful the

Table 1: Summed variables.

Summed variable	Number of items	Inter-item correlation	Mean	Standard deviation	Cronbach's alpha
The experience of meaningfulness	6	0.25–0.75	4.09	0.67	0.787
The experience of relevance	5	0.28–0.59	3.34	0.78	0.801
The experience of novelty	5	0.14–0.44	3.54	0.72	0.692

tasks were and how much the tasks elicited collaborative dialogue. Second, the *experience of the relevance* of the tasks comprised items measuring how irrelevant or relevant each of the five tasks was regarding what the students should learn in school. Third, *the experience of the novelty* of the tasks contained items measuring how traditional or novel the students found each of the five tasks compared with the previous tasks they had done.

The summed variables were used to analyse students' experiences by comparing participants' answers and background information (school grade, gender and home language) using t-tests and one-way ANOVA, followed by post hoc tests (Tukey HSD). Additionally, the general linear model (profile analysis) was used to investigate the differences in the novelty experienced in the five tasks.

5 Results

The open-ended question elicited short reports of students' experiences regarding how materials functioned in multilingual classrooms and what happened during a learning experiment that involves collaborative dialogue (cf. Guerretaz and Johnston 2013). To address the first research question, verbalising problem-solving strategies that aligned with the social and cognitive aims of the linguistic escape room was characteristic of the reports; 76.9% of the students (97 participants) demonstrated that they either created a solution by processing metalinguistic awareness (48 participants), analysed the exercise in collaborative dialogue (24 participants) or activated individual cognitive processes (25 participants). Figure 4 presents the frequencies of the students' reports according to the analytical categories (1–7; see Section 4.1).

Additionally, 8.7% (11 participants) reported having a meta-level discussion, assessing the quality of the tasks but not directly referring to problem-solving. However, the reports can also be seen as reflecting the reality of language classes

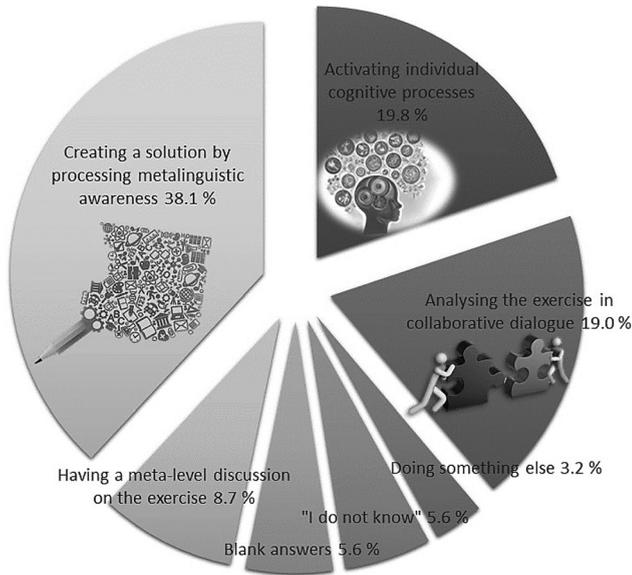


Figure 4: Reported problem-solving strategies.

in schools today, as 11.2% of the students (14 participants) either wrote that they did not know how they solved the tasks (7 participants) or left the answers blank (7 participants). Finally, 3.2% (4 participants) wrote that they did something else. The key findings of each category will be described with theoretical references and data examples in Section 5.1.

Considering the categories in Figure 4, it could be observed that the students' answers did not necessarily reflect how the students actually solved the tasks; rather, they were the students' reports thereof. Regarding collaborative learning, realistic tasks are messy (Council of Europe 2019). Thus, it is possible that a student who analysed the morphosyntax of the gibberish Finnish (task iv) might have focused on a peer-to-peer negotiation in their report; another student may have left an answer blank, even though they participated in rearranging the letters of the anagram (task iii). Given the qualitative nature of the analysis and the relatively small sample size, generalisations from the findings must be made carefully. Nevertheless, languaging as a method provides insight into the multiple voices with which the students arranged and articulated their thinking about linguistic problem-solving and materials' role in shaping classroom activity from the students' point of view (cf. Guerretaz 2021). Regarding language learners as participants, the analysis echoes the demands of academic language of school (Lucas and Villegas 2013; Schleppegrell 2004).

5.1 Ways of languaging linguistic problem-solving

5.1.1 Creating a solution by processing metalinguistic awareness

The first analytical category concerns *creating a solution by processing metalinguistic awareness*. In reported problem-solving strategies, the students characteristically demonstrated their previous understandings of linguistic content based on what they had been taught in school, reflecting knowledge about Finnish syntax, morphosyntax, lexicon, morphology and phonology. As Examples 1 and 2 show, the students appear to have refined their solutions by evaluating their awareness of subject–verb agreement when reporting the strategies they used (words indicating such awareness have been bolded). The reports concern task iv (conjugating a verb in gibberish Finnish).

Example 1 *When it comes to the verb jaffata, one has to know how **to conjugate personal pronouns**. – –*
*jaffata-verbissä täytyy osata **taivuttaa persoonapronomint**. – –*
 #72/GIRL/5th GRADE/NATIVE FINNISH-SPEAKING STUDENT

Example 2 *In the jaffata task, it helped me that I knew all the **declinated forms of the verbs**. The key was to learn how **to conjugate verbs**.*
*jaffata-tehtävässä auttoi se, että tiesin kaikkien **verbien taivutusmuodot**. Juju oli **verbin taivuttamisen oppiminen**.*
 # 119/GIRL/6th GRADE/MULTILINGUAL STUDENT

By referencing ‘how to conjugate personal pronouns’, the student in Example 1 shows awareness of conjugation, yet remains vague in her report. In fact, one does not conjugate personal pronouns, but verbs in Finnish must agree with the subject with regard to point of view (1st, 2nd and 3rd) and number (singular, plural) (Helasvuo and Laitinen 2006). Furthermore, by reporting knowing ‘all the declinated forms of the verbs’, the student in Example 2 indicates that she found the solution by conjugating *to jaffata* using analogy to find the correct personal suffixes (i.e. *minä jaffaan, sinä jaffaat, hän jaffaa/I jaffa, you jaffa, s/he jaffas*). If *jaffata* were an actual Finnish verb, it would belong to an expansive group of Finnish contraction verbs that adopt words, for instance, from English (the verb type ends with any vowel + *ta/tä*, and the stem can be found by removing the *ta/tä* and adding an extra *a/ä*, see VISK § 330).

Similarly, creating a solution by processing previous metalinguistic awareness manifested as reports of problem-solving by utilising linguistic concepts (concepts have been bolded). For instance, students’ intrapersonal reports include strategies such as ‘I tried replacing the **letter i** with another **vowel**’ (in task v, reading and

answering a message written in secret language), ‘**personal pronouns** helped me’ (in task iv, conjugating a verb in gibberish Finnish) and ‘in the word transformation task, one must interchange the two **letters**’ (in task iii, decoding word transformations). In this way, the students demonstrated their ability to explicitly express what metalinguistic or conceptual awareness (e.g. vowels, personal suffixes or letters) the tasks sought to engage (Roehr and Gánem-Gutiérrez 2009). Simultaneously, a typical report suggested that successful problem-solving required developing such awareness further, reflecting the higher end (*evaluating* and *creating*) of the Taxonomy of Cognitive Process (Anderson and Krathwohl 2001). This happened by reporting strategies describing acts of linguistic elaboration (verbs indicating elaboration have been bolded); the students languaged their acts by reporting that they **transformed words**, **interchanged letters** or **put vowels in place correctly** to create new understanding. Here, the reported descriptions communicate using metalinguistic awareness as a tool for linguistic enquiries (i.e. when answering a message in *i-language*) and mediating complex thinking via intrapersonal languaging.

Furthermore, characteristic of the analytical category was the inclusion of reports implying previous metalinguistic awareness processing; however, for some reason, linguistic concepts were often vague, as Example 3 illustrates (words indicating inaccuracy have been bolded). Here, a student is reporting how he solved tasks iv and v.

Example 3 *When one knew that one had to use **I, you, s/he, we, you, they** (to jaffata). all **aeiouyää** turns into an i (I language)*
*kun tiesi että piti käyttää **minä, sinä, hän, me, te, he** (jaffata).*
*kaikki **aeiouyää** muuttuu i:ksi (i-kieli)*
 #25/BOY/4th GRADE/NATIVE FINNISH-SPEAKING STUDENT

As seen in Example 3, the student was recalling his awareness of subject-predicate agreement (by reporting *I, you, s/he, we, you, they*) and vowels (by reporting *aeiouyää*) but not mediating the exact linguistic concepts. This suggests an opportunity to support the student’s conceptual awareness in such a way that he could select these parts of language as an affordance (van Lier 2004). For instance, after realising from which linguistic features and areas of grammar the student drew his reasoning when solving the tasks, a teacher could scaffold both the development of academic linguistic competence and knowledge construction by assisting him to go deeper in the discussion to facilitate questions (cf. Tharp et al. 2000). Alternatively, a teacher could ask, ‘What else could we call those **aeiouyää** (vowels)?’ This would bridge academic concepts with the student’s awakening language awareness. Furthermore, by translating *I, you, s/he, we, you, they* into ‘personal pronouns that are needed for subject–verb-agreement of Finnish verbs’,

a teacher would teach subject-specific language and build on learners' linguistic resources when the need for the concepts arose from the students' collaborative dialogue in conversational language (cf. Cummins 2000).

5.1.2 Analysing the exercise in collaborative dialogue

The reports in the second analytical category, *analysing the exercise in collaborative dialogue*, highlight social interaction and solving the tasks together with a peer (Lantolf and Thorne 2006; van Lier 2000) instead of linguistic content. Characteristically, collaboration as a problem-solving strategy manifested in describing language negotiations, shared thinking and joint linguistic enquiries, as Examples 4 and 5 (relating to task iv) introduce (words indicating collaboration have been bolded).

Example 4 *I talked with my peer about what would fit in those (to jaffata)*
Mä puhuin minun parini kanssa mitä sopisi niihin (jaffata)
 #7/GIRL/4th GRADE/MULTILINGUAL STUDENT

Example 5 [We] *talked with a friend. Me and my friend pondered*
kaverin kanssa puhuttiin. minä ja kaverini miettsimme
 #18/GIRL/4th GRADE/MULTILINGUAL STUDENT

In Examples 4 and 5, both students started with *talking* as a strategy, possibly reflecting the dialogue during the experiment. By continuing with 'about what would fit in those', the student in Example 4 refers to an enquiry in which the students collectively tried to conjugate *jaffata* as a verb. Furthermore, the importance of peer-to-peer support arose in the following reports (words indicating shared analysis have been bolded): '**We thought about it together** and **the solution came to our minds**' and '**I worked with a peer** and **learned new things**'. Additionally, togetherness manifested as *we* or *us* as participants analysed the tasks, often without mentioning a peer; for example, reports such as '[We] **talked with each other**' and '**I spoke with the group**' contained the collaborative *us*. Note that, in standard written Finnish, finite verbs have a morphological structure in which a person is marked with a morpheme. Therefore, the personal pronoun of the sentence can sometimes be left out, but the personal marking cannot (VISK § 107). Then again, in informal spoken Finnish, first-person plural is very frequently expressed with an incongruent pronoun and verb combination (*we* + impersonal verb form) (Shore 1988; VISK § 1326).

Often, interpersonal communication, as a problem-solving strategy, explicitly reflects mutual support (words indicating peer-to-peer support have been bolded). Reports, such as '**my peer helped me**' and '**my peer spoke i-language when s/he was little**', suggest how collaboration provided temporary support during

problem-solving (Tharp et al. 2000; Vygotsky 1962, 1986). Individually, a student perhaps could not write a message in *i*-language, but collectively, with a peer who knows *i*-language, solving the task becomes possible. Moreover, a student with prior awareness of Finnish phonology becomes the expert on how to read and write in *i*-language. At best, by modelling their understanding of vowels, students can share resources that other students can appropriate into their own metalinguistic awareness (Dufva 2013).

5.1.3 Activating individual cognitive processes

The third analytical category, *activating individual cognitive processes*, manifested as descriptions of cognitive skills as a problem-solving strategy. That the solution to a linguistic problem was not discovered collectively but as a result of individual *remembering* and *understanding*, relating back to the lower end of the Taxonomy of Cognitive Process (Anderson and Krathwohl 2001), was characteristic to these responses. Example 6 demonstrates such languaging of an individual cognitive effort (words indicating individual processes have been bolded).

Example 6 ***I remembered everything because I had been practicing. I just tried to do it without any*** [support]
 minä muistin kaikki koska olin harjoitellut. ***minä yritin vain***
 ilman mitään asiaa [apuvälinettä] ***tehdä***
 #124/GIRL/6th GRADE/MULTILINGUAL STUDENT

Similarly, students used verbs of cognition (bolded): ‘I just **knew** it [the solution]’; ‘that I **thought** about it [the solution]’; ‘because I **considered** it [the solution] carefully’; ‘transform, **learn, memorise, understand** and **realise**’; or ‘I **got** the message **resolved**’. However, by mediating problem-solving strategies in this way, the students often remained inaccurate in their intrapersonal communication regarding exactly how and with the help of what the students came to the solution. Instead, the students often referred to their private speech (Swain and Watanabe 2013). For instance, as a strategy for solving task iv (conjugating a verb in gibberish Finnish), one student verbalised their problem-solving strategy as follows (words indicating private speech have been bolded): ‘**I said it**, for instance, to jaffa, **in my head**, and **thought** about how it would go. **I remembered** the language’. Linguistically, such reports appear to explain what *I did*, not what *we did*.

Interestingly, the analytical category of activating individual cognitive processes also included strategies that drew on students’ previous understandings. However, the students here did not seem to have enough metalinguistic and conceptual awareness to language precisely what that understanding was, as Example 7 illustrates (words indicating previous understandings have been bolded).

Example 7 *I just knew it. The key was yeah yeah – **it helped me** to solve the task **that it sounded very similar**
 minä vaan tiesin. juu oli joo joo **minua auttoi** ratkaisemaan
 tehtävän **se, että se kuulosti ihan samalta**
 #97/BOY/6th GRADE/MULTILINGUAL STUDENT*

By reporting that something ‘sounded similar’, the student made an analogical comparison to (possibly linguistic) content he encountered previously (Kauppinen 1998), stating that the content led him to ‘just [knowing]’ the solution. Especially, as the participant is a multilingual student, the answer exemplifies the demands of the academic language of school (Lucas and Villegas 2013; Schleppegrell 2004). Similarly, in statements such as ‘[the tasks] were **like what we had before**, and that is why it was easy to think’, the students were reflecting previously learnt content; however, for some reason, their metalinguistic and conceptual awareness—or any specific awareness, for that matter—was not elicited. This reveals another opportunity for classroom discussion on how language similarity could be tied to students’ existing awareness of language in such a way that they receive it as an affordance (van Lier 2004). As affordances require a connection that happens through a process of noticing and reflection (Dufva 2013; van Lier 2004), the student who reported that ‘the tasks were like what we had before’ (when talking about conjugating a verb in gibberish Finnish) probably needs more support than the student who wrote ‘one had to use I, you, s/he, we, you, they’; the latter seems to have already found the solution for conjugating verbs via awareness of personal pronouns.

5.1.4 Having a meta-level discussion on the exercise

In the fourth analytical category, the students demonstrated *having a meta-level discussion on the exercise*. One characteristic of such discussions was assessing the *difficulty* or *ease* of the tasks on an imaginary scale, as shown in Example 8 (words indicating assessment have been bolded); a student is reporting the quality of tasks i, iii and v.

Example 8 *The word transformation task was **quite easy**. It was a **bit difficult**, that i-language task and the task with instructions on how to prepare möhjö
 Sananmuunnostehtävä oli **aika helppo**. se oli **vähän vaikea**
 eli se i-kielen tehtävä ja möhjö teko-ohje tehtävä
 #28/GIRL/4th GRADE/MULTILINGUAL STUDENT*

Similarly, the students often described the quality of the tasks with various adjectives and adverbs of intensity (on intensifiers cf. Hakulinen et al. 2004; VISK § 666), such as ‘the task was **very funny**, it was **difficult** to solve the message in *i-language*’ and ‘it was **pretty clear** to me’ instead of addressing actual problem-solving strategies.

5.1.5 Doing something else, not knowing or leaving an answer blank

The last three analytical categories applied only to a small number of participants. The fifth category considered reports of *doing something else*. Here, the students did not report any clear problem-solving strategy; rather, they fooled around or conducted the tasks dishonestly, such as in the report ‘I cheated by cheating’. The sixth analytical category comprises answers explicitly saying ‘*I do not know*’, and the seventh category contains the *answers the students left completely blank*.

5.2 Comparing the results of students with diverse backgrounds

As the students articulated their problem-solving strategies in multi-voiced ways, it was possible to cautiously compare the groupings of analytical categories among students with diverse backgrounds. Even though there were no statistically significant differences between the reports of NFLs and MLLs, Figure 5 shows some interesting variations between the groups.

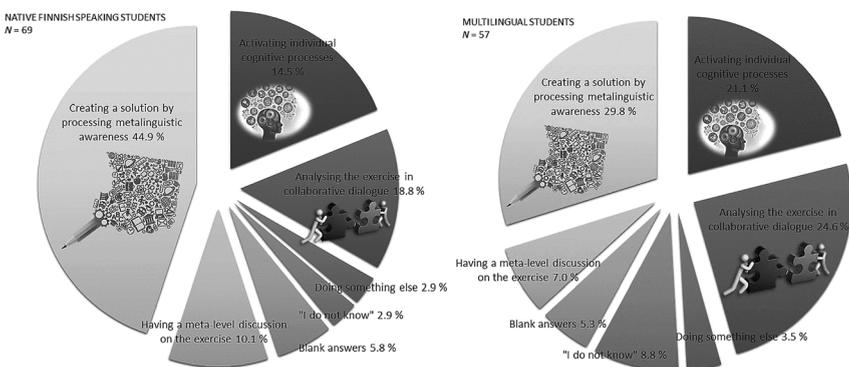


Figure 5: Comparison of the reported problem-solving strategies between NFLs and MLLs.

Note that the NFLs drew on metalinguistic awareness in their problem-solving strategies more often than the MLLs; 44.9% of the NFLs (31 participants) reported processing their metalinguistic knowledge, whereas 29.8% of the MLLs (17 participants) reported the same. The MLLs' answers referred to collaboration and shared thinking more often than the answers of the NFLs: 14.5% of the NFLs (10 participants) verbalised analysing the exercise through collaborative dialogue, whereas 24.6% of the MLLs (14 participants) verbalised the same. However, both groups reported problem-solving strategies that aligned with the aims of the exercise, as analytical categories 1–3 comprised more than 75%, and the amount of non-reported strategies, i.e., categories 5–7, remained less than 20% in both groups. Here again, as the group of MLLs comprised students, developing competence in the Finnish language might considerably affect the results. However, the qualitative analysis, as presented in previous sections, elicits detailed suggestions of what the students' needs are for linguistic support when participating in the exercises in a collaborative dialogue.

No statistically significant differences were found between the reports of girls and boys (Figure 6).

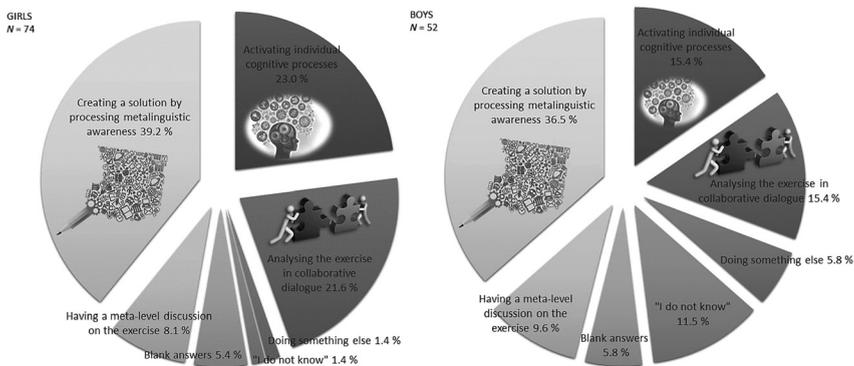


Figure 6: Comparison between girls' and boys' reported problem-solving strategies.

However, looking closer at the girls' answers, the three largest categories (creating a solution by processing metalinguistic awareness, analysing the exercise in a collaborative dialogue and activating individual cognitive processes) comprised 83.8% of the responses (62 participants), while for boys, the same was only 67.3% (35 participants). The boys reported doing something else, being unaware or leaving an answer blank more often than the girls. Although dichotomously categorising students into boys and girls does not fully describe the reality of classrooms and often leads to unnecessary stereotyping, several international assessments (PISA, PIRLS) still apply such a categorisation. It is possible that the

results of the current study could also be due to Finnish boys' weaker skills in language strategies (Leino et al. 2018). However, when interpreting the results, it must be noted that—on a grassroots level—an individual student's skills in the classroom cannot always be explained this simply.

5.3 Engagement in linguistic problem-solving tasks: experiences of meaningfulness, relevance and novelty

To answer the second research question, the analysis of the summed variables indicates that, overall, the students found the tasks engaging. As seen in Table 1 in Section 4.2, the mean (M) of each summed variable was quite high (on a Likert scale of 1–5, $M = 4.09$ for meaningfulness, $M = 3.34$ for relevance and $M = 3.54$ for novelty [the higher the mean, the more the students agreed that the tasks were meaningful, relevant or novel]). A closer look at the summed variables, however, elucidates what to consider when developing the tasks further in cases when the experiences of the students with diverse backgrounds (school grade, gender and home language) vary.

The summed variable *the experience of the meaningfulness of the tasks* comprises the six items, as presented in Figure 7.

While analysing the students' experiences of meaningfulness, there were significant differences in the reports of students from different grades: $F(2, 123) = 4.79$; $p = 0.01$. A post hoc test (Tukey HSD) indicated that the 6th grade students ($M = 3.83$) found the tasks less meaningful than the 4th ($M = 4.21$, $p = 0.02$)

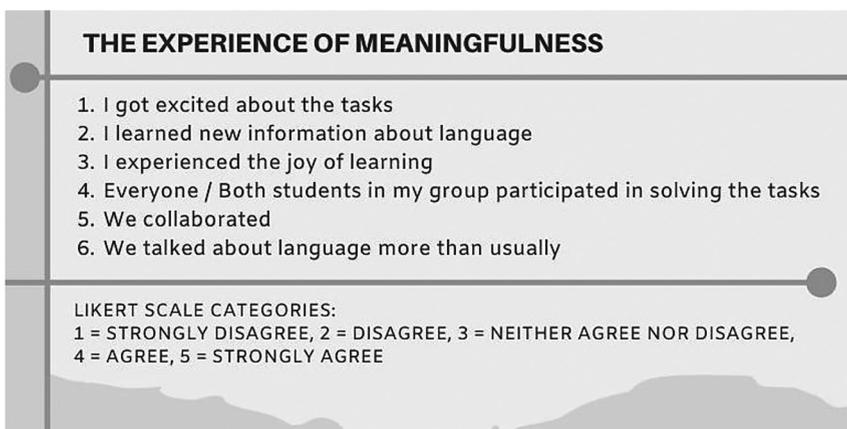


Figure 7: The experience of the meaningfulness.

and 5th grade students ($M = 4.21$, $p = 0.03$). The effect size was moderate to high ($\eta^2 = 0.07$).

Furthermore, although both girls and boys agreed that the tasks were meaningful, the girls' reports ($M = 4.26$) were statistically higher than the boys' ($M = 3.84$), $t(124) = 3.60$; ($p < 0.01$); Cohen's effect size value ($d = 0.66$) suggests a moderate to high practical significance. However, whether or not a student had a multilingual background did not have a statistically significant effect on how meaningful they found the tasks ($M = 4.09$ for NFLs; $M = 4.13$ for MLLs). Thus, solving linguistic problems and playing with language through collaborative dialogue seems to be equally engaging for students of all linguistic abilities.

The summed variable *the experience of the relevance of the tasks (in terms of learning)* comprises five items (Figure 8).

Like the experiences of meaningfulness, the girls ($M = 3.53$) experienced the tasks as more relevant than the boys ($M = 3.08$). The difference was statistically significant, $t(124) = 3.29$; $p < 0.01$, and Cohen's effect size value ($d = 0.60$) again suggested a moderate to high practical significance. Also, considering whether they found the tasks relevant or somewhat relevant, there were no statistical differences in the experiences of students from different grades ($M = 3.49$ for 4th graders, $M = 3.38$ for 5th graders and $M = 3.15$ for 6th graders) or the experiences of students from different linguistic backgrounds ($M = 3.34$ for NFLs and $M = 3.34$ for MLLs). Thus, it can be concluded from the analysis of the first two summed variables that developing tasks that draw more on boys' interests would be beneficial. Socialising boys with language playing to the same extent as girls requires resources and further research, as recent studies present multiple links between students' attitudes and their competences when explaining the gender gap (cf. Kauppinen and Marjanen 2020).

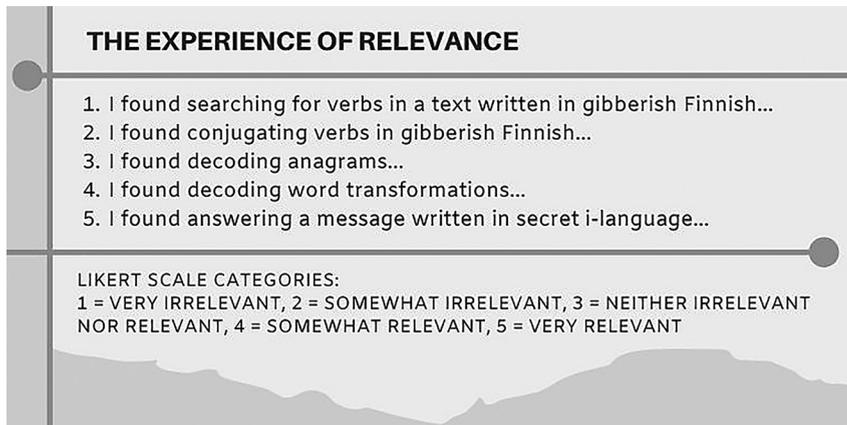


Figure 8: The experience of the relevance.

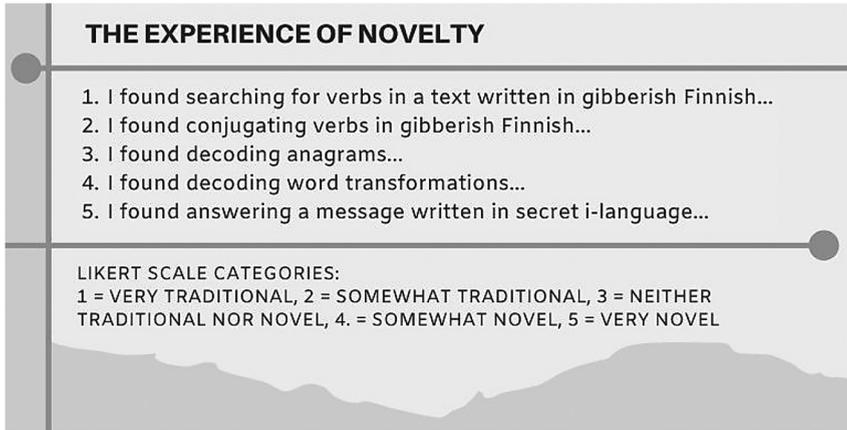


Figure 9: The experience of the novelty.

The summed variable, *the experience of the novelty* of the tasks (compared with tasks a student has done previously), includes five items (Figure 9).

Regarding background information, there were no statistical differences between the experiences of students from different grades ($M = 3.46$ for 4th graders, $M = 3.64$ for 5th graders and $M = 3.52$ for 6th graders), the experiences of girls ($M = 3.52$) and boys ($M = 3.56$) or the experiences of NFLs ($M = 3.63$) and MLLs ($M = 3.43$). Interestingly, when comparing the novelty experienced between tasks i–v, task iv (conjugating a verb in gibberish Finnish) was reported as more traditional ($M = 3.12$) than task i (reading an instruction in gibberish Finnish and searching for verbs in the text, $M = 3.76$) and task v (reading and responding to a message written in a secret language, $M = 3.81$). According to a post hoc test (Tukey HSD), the differences were statistically significant, $p < 0.01$; the students appeared to experience the tasks involving doing things in secret languages, playing in a more complex way or creating a new language (for instance, trying to communicate in *e-language* using the same logic of *i-language*) as more novel.

6 Discussion

The tasks in the learning materials play a significant role in the affordances for language learning (Garton and Graves 2014). This study overviewed the field of learning material studies (e.g. Garton and Graves 2014; Guerrettaz 2021; Guerrettaz et al. 2021; Guerrettaz and Johnston 2013), exploring how linguistic problem-solving tasks shape classroom activity from the students' point of view. Two

research questions were set to primarily investigate how linguistic problem-solving tasks are encountered in multilingual classrooms to develop textbook material that 1) reflects sociocultural language learning theories and 2) engages students in discussion on language. The findings outline and describe the reported linguistic problem-solving strategies and experiences of students with diverse backgrounds participating in a linguistic escape room exercise that involved interpersonal communication.

To constitute a much needed contribution to the field of learning material studies (Garton and Graves 2014; Guerrettaz 2021; Guerrettaz and Johnston 2013), the study aims to provide an empirical example of how task-based learning materials function in multilingual environments. That is, the study deepens the understanding of how collaborative problem-solving tasks affect affordances and interactions in multilingual classrooms. This way, the study aligns with a recent shift in the field in emphasis from materials for language teaching to language learning (Tomlinson and Masuhara 2018), i.e., the actual use of materials (Garton and Graves 2014; Guerrettaz 2021; Tomlinson 2012). To answer the first research question, characteristic was that most students demonstrated metalinguistic awareness, analysed the exercise through collaborative dialogue and activated individual cognitive processes when solving the tasks of the exercises (i–v). The findings indicate that social and cognitive processes that intertwine in language learning (Lantolf and Thorne 2006; Vygotsky 1962, 1986) are visible in the students' reports and align with the aims of the exercise. The study shows that when adding linguistic problem-solving tasks to learning materials, the students seem to operate in a way that the collaborative nature of academic language learning emerges as its own analytical category (where the student reports highlight social interaction and solving tasks in interpersonal communication) and as an area that needs aid from the teacher (as in the examples of other categories) (cf. Tharp et al. 2000). Based on the reports, collaborative problem-solving tasks appear to shape classroom activity towards a situation where affordances can be noticed and adopted (cf. van Lier 2004). To answer the second research question, the analysis of the experiences of the meaningfulness, relevance and novelty of the tasks suggests that MLLs are equally engaged in linguistic problem-solving in the form of a language play as NFLs. That is, when designing new materials, the ownership of language play in Finnish, which NFLs traditionally might demonstrate, could be questioned more often and explicitly widened to belong to MLLs (Swain 2006).

This study has some limitations. The most important is the limited number of tasks that were tested (one exercise with five tasks). Nevertheless, focussing on the students' reported linguistic problem-solving strategies and experiences makes it possible to understand how exercises can bridge language learning with students'

awakening language awareness. On a larger scale, language educators can benefit from the increased understanding of how problem-solving tasks as material elements can enhance possibilities for meaningful and effective learning and teaching metalinguistic awareness (cf. Guerrettaz et al. 2021).

7 Conclusions

The significance of the study lies in the effort to design language aware materials in such a way that the exercises promote learning for all vulnerable learners. As a conclusion, we suggest the following points (a–c) to design more engaging materials: a) The future textbooks should contain exercises that bring language to the centre of classroom discussion in a format where students can solve semantic triggers or play with the language (Cook 2000); in this way, the students, regardless of their backgrounds, will find language learning tasks meaningful. Further, b) the future exercises could be designed to frequently elicit collaborative dialogue (instead of emphasising mechanical memorisation and working individually [cf. Aalto and Kauppinen 2011; Rättyä 2017]), during which co-constructing subject-specific language and metalinguistic awareness is generated in a peer-to-peer support. Additionally, c) the textbooks could be added tasks wherein students report the problem-solving strategies they used when accomplishing the actual exercises. This way, applying languaging as intrapersonal communication could help the teachers of diverse classrooms access their students' existing metalinguistic awareness and recognise learning gaps. This would resonate with the current understanding of language development to an advanced level; students who provide explanations to themselves after learning tasks develop a more accurate, more complete and deeper understanding of the content than students who are not asked to verbalise their thinking (Swain 2006).

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Competing interests: Despite being part of the development project, the authors certify that they do not benefit financially from the textbook concerned

in the study, as the textbook is free and publicly available on site <https://sites.utu.fi/minasta-ja-kielesta-kiinni/wp-content/uploads/sites/179/2021/02/Kielest%C3%A4-koppi-oppimateriaali.pdf>.

Appendix

Appendix 1: Survey

LINGUISTIC ESCAPE ROOM

The first two letters of your first name: _____

The first two letters of your surname: _____

School: _____ Grade: _____ Age: _____

Gender: girl / boy / other Home language(s): _____

How did you solve the exercise?

When participating in the exercise...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I got excited about the tasks					
I learned new information about language					
I experienced the joy of learning					
Everyone / Both students in my group participated in solving the tasks					
We collaborated					
We talked about language more than usually					

I found searching for verbs in a text written in gibberish Finnish...

very irrelevant (in terms of learning)	somewhat irrelevant	neither irrelevant nor relevant	somewhat relevant	very relevant (in terms of learning)
-------------------------------------------	---------------------	---------------------------------	-------------------	-----------------------------------------

very traditional (in comparison with previous tasks I have done)	somewhat traditional	neither traditional nor novel	somewhat novel	very novel (in comparison with previous tasks I have done)
---------------------------------------------------------------------	----------------------	-------------------------------	----------------	---------------------------------------------------------------

I found decoding anagrams...

very irrelevant (in terms of learning)	somewhat irrelevant	neither irrelevant nor relevant	somewhat relevant	very relevant (in terms of learning)
-------------------------------------------	---------------------	---------------------------------	-------------------	-----------------------------------------

very traditional (in comparison with previous tasks I have done)	somewhat traditional	neither traditional nor novel	somewhat novel	very novel (in comparison with previous tasks I have done)
---------------------------------------------------------------------	----------------------	-------------------------------	----------------	---------------------------------------------------------------

I found decoding word transformations...

very irrelevant (in terms of learning)	somewhat irrelevant	neither irrelevant nor relevant	somewhat relevant	very relevant (in terms of learning)
-------------------------------------------	---------------------	---------------------------------	-------------------	-----------------------------------------

very traditional (in comparison with previous tasks I have done)	somewhat traditional	neither traditional nor novel	somewhat novel	very novel (in comparison with previous tasks I have done)
---------------------------------------------------------------------	----------------------	-------------------------------	----------------	---------------------------------------------------------------

I found conjugating verbs in gibberish Finnish...

very irrelevant (in terms of learning)	somewhat irrelevant	neither irrelevant nor relevant	somewhat relevant	very relevant (in terms of learning)
-------------------------------------------	---------------------	---------------------------------	-------------------	-----------------------------------------

very traditional (in comparison with previous tasks I have done)	somewhat traditional	neither traditional nor novel	somewhat novel	very novel (in comparison with previous tasks I have done)
---------------------------------------------------------------------	----------------------	-------------------------------	----------------	---------------------------------------------------------------

I found answering a message written in secret language...

very irrelevant (in terms of learning)	somewhat irrelevant	neither irrelevant nor relevant	somewhat relevant	very relevant (in terms of learning)
-------------------------------------------	---------------------	---------------------------------	-------------------	-----------------------------------------

very traditional (in comparison with previous tasks I have done)	somewhat traditional	neither traditional nor novel	somewhat novel	very novel (in comparison with previous tasks I have done)
---------------------------------------------------------------------	----------------------	-------------------------------	----------------	---------------------------------------------------------------

Continued.

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