



RESEARCH PAPER

Young L2-Learners' Meaning-Making in Engaging in Computer-Assisted Language Learning

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Abstract

This study explores how newly arrived young students created meaning, communicated, and expressed themselves using digital technology in the subject of Swedish as a second language (SSL). The qualitative case study presented in this article focuses on how the orchestration of teaching contributed to opportunities for digital meaning-making in the SSL subject in four classrooms at three schools in a city in Sweden. The notion of language as being fluid, which involves a critical approach to languages as separable entities, considers linguistic and embodied meaning-making, including digital technology, in social processes. This approach recognizes the roles of technology and digital meaning-making **in young students' second language acquisition. Moreover, technological innovations facilitate immediate and accessible communication. In today's language studies, ethnicity** only is not considered an adequate focus of analysis. Furthermore, the meaning-making practices of newly arrived primary school-aged students remain under-investigated. In the present study, data collected in classroom observations and teacher interviews **revealed three themes regarding the students' utilization of digital technology to develop** their multilingual skills. One insight was that the newly arrived students used digital technology strategically when they engaged in meaning-making activities with peers and teachers. When the students took the initiative in computer-assisted language learning, they displayed agency in meaning-making by being their own architects. The findings of this research provided insights into how the orchestration of teaching in Swedish as a

second language to newly arrived students affects their opportunities to use multilingualism in meaning-making while employing digital technology.

Keywords

digital meaning-making; multilingual practice; newly arrived students; orchestration; second language acquisition; Swedish as a second language; translanguaging.

1. Introduction

In the 21st century, new technological innovations and new ways of interacting have created immediate and accessible communication. The dynamic nature of migration has led to the reconstruction of language studies, and ethnicity is no longer considered an adequate focus of analysis (Blackledge & Creese, 2010, 2017; Blommaert, 2011). Instead, language is deemed to be created in a complex dynamic of identity, ethnicity, class, and gender, which are framed within a broad political context (Block & Cameron, 2002). In recent years, researchers have begun to adopt a conceptual understanding of language use, moving away from the concept of bilingualism and instead paying attention **to multilingualism and "translanguaging"** (Kusters, Spotti, Swanwick & Tapio, 2017). Translanguaging is conceptualized as the act of accessing different linguistic features or various modes in the multilingual communicative meaning-making, in order to maximize communicative potential (García, 2009).

When digital technology is integrated into teaching, students can use it as a tool to create their own content (D. W. Rowe & Miller, 2016). Migration and the use of technology can be traced in teaching, where the integration of digital technology potentially provides students with migration background opportunities to create meaning using several modes and media (Honeyford, 2013; Pacheco & Smith, 2015; D. W. Rowe & Miller, 2016; Sofkova Hashemi, 2017; Toohey et al., 2015; Zapata, Valdez-Gainer & Haworth, 2015).

The study presented in this article focuses on digital meaning-making by newly arrived students¹ (grades 1–3; 7–10 years) in Swedish as a second language (SSL). The study is focused on exploring how newly arrived young students create meaning, communicate, and express themselves using digital technology in the SSL classroom. Moreover, the **study investigates how the organization of digital technology influences students' meaning-making.**

Multimodal digital meaning-making and L2-learners have been the focus of several previous studies (Honeyford, 2013; D. W. Rowe & Miller, 2016; Sofkova Hashemi, 2017; Zapata et al., 2015). Other studies have demonstrated the benefits of combining digital technology and translanguaging in teaching (Pacheco & Miller, 2016; L. W. Rowe, 2018; Toohey et al., 2015). Martin-Beltrán (2010) found that by encouraging newly arrived students to use all their linguistic resources and giving them space to learn from each **other's languages, they were able** to create language bridges and thus new opportunities for language learning. In multimodal teaching methods, students are also encouraged to use all their linguistic resources, including visual and auditory ones. The focus extends beyond the target language (Pacheco & Miller, 2016). L.W. Rowe (2018) emphasized the **potential of using technology to support multilingual students' translanguaging abilities**, such as by using audio technology in the creation of e-books.

Although technology is present in many classrooms today, there is still a need for knowledge about how the incorporation of technology in teaching can contribute to **opportunities for newly arrived students' meaning-making.** In a study conducted in 131 preschool classrooms in Sweden, Norway, and Finland, the researchers estimated that although multilingual children were present in 82% of the classrooms, the learning

¹ The term "newly arrived" (nyanlända) is used throughout this article to refer to students who have been resident abroad and who have lived in Sweden for four years or less, which is the official definition of the concept in Sweden.

environment did not satisfactorily **reflect either students' multilingualism or the ongoing societal changes in digital and multimodal literacy** (Hofslundsengen et al., 2020).

Teaching encompasses a wide range of activities and processes that require well-organized management. The organization of these activities and procedures, which is **generally driven by the teacher, is referred to as "orchestration"** (Phiri, Meinel & Suleman, 2016). The metaphor of orchestration emphasizes teachers' challenges in the classroom using technology. Orchestration can be defined as **"the methods and strategies empowered by a technology equipped classroom that an educator may adopt carefully to engage students in activities conducive to student success and learning"** (Chan, 2013, p. 515). Based on this rationale, the following research question is addressed:

RQ1: How do the diverse types of orchestration of teaching implemented by the teachers contribute to opportunities of digital meaning-making for newly arrived students in the SSL subject?

2. Background and central concepts

In the fall of 2015, the number of immigrants to Sweden increased significantly. Over 160,000 people applied for asylum, about 70,000 of whom were children (Migrationsverket, 2016). Today in our globalized world, people move between countries to a higher extent than previously. During 2018, the **foreign-born part of Sweden's population** increased by 80,000. At year-end, the number of those born outside Sweden was nearly 1,960,000 - **about 19 % of Sweden's total population** (Statistikmyndigheten SCB, 2020).

The increase in the number of newly arrived students in classrooms has raised questions concerning the development of SSL, and the concept of translanguaging has been put **forward as a way of understanding what could also be called "multilingualism."** However, the term multilingualism can be used to include the coexistence of two or more languages within the educational setting (Buendgens-Kosten, 2018), whereas the concept of translanguaging involves a critical approach to languages as separable entities (García & Wei, 2014). **Researchers of translanguaging "reject the notion of separate, bounded languages as defined by nation-states and their institutions and instead capture the meaning-making potential of the fluid semiotic practices of multilinguals"** (García & Kleifgen, 2019, p. 4). Translanguaging is conceptualized in terms of including the person's linguistic and embodied meaning-making, including digital technology, in social processes (García & Kleifgen, 2019).

Because the term "multimodality" broadens the perspective on language to include, for example, images and sound, it relates to translanguaging and its questioning of language. Digital devices facilitate the use of different modes in communication and meaning-making activities in the classroom (Jewitt, 2009). In this study, the concept of translanguaging is relevant because teachers and multilingual students collaborate to explore meaning-making based on digital and multimodal language practices. The research on multimodal meaning-making in second language education has emphasized the importance of a dialogic focus in using digital technology (Currie, 2016; Lantz-Andersson & Säljö, 2014). Therefore, it is essential that students express their **experiences of multilingualism and their understandings of "difference influenced by the present"** (O'Mara & Harris, 2016, p. 655). L. W. Rowe (2018) argued that it is vital to **value students' languages and cultures, to promote the value of speaking multiple languages, and to encourage students to use all their linguistic resources.**

3. Previous research

Multimodal meaning-making offers opportunities for multilingual students to express themselves in various modes (Honeyford, 2013; Pacheco & Smith, 2015; Sofkova Hashemi, 2017; Zapata et al., 2015) and to utilize their cultural experiences in creating multimodal texts. Honeyford (2013) focused on this issue in an ethnographic case study on multimodal digital text composition (11–14 years). The study's aim was to understand the multimodal texts that one multilingual student (12y) produced and how identity,

power, and literacy interacted in the student's meaning-making. Although the multilingual student created his digital story using the same software his peers used as well as a similar process, he manipulated the artifacts to represent him and his story. The **multilingual student's** digital narrative differed from those of his peers because he used digital technology in an imaginative manner to portray his reality as a multilingual individual. Through layering modes, the student expressed identities in ways not typically afforded by written texts. Digital technology enabled the student to apply multimodal storytelling to represent his perspective, and he was able to explore his own identity using the digital tools.

Zapata et al. (2015) argued that multilingualism is advantageous when students are allowed to use several modes and all their language resources in creating multimodal content. They described a situation where third and fourth grade Latino students used both English and Spanish languages in combination with other semiotic and multimodal resources to create multimodal and multilingual picture books. Their findings showed that translanguaging could create more opportunities for communication and meaning-making. **In a study on preschoolers' opportunities to use multiple languages**, which was offered by a voice recording feature used in creating a multilingual e-book, D. W. Rowe and Miller (2016) found that the preschoolers' ability to recognize and use different languages was strengthened. The voice recording feature made it possible for the preschool students to use their mother tongue in the classroom, and it facilitated the integration of multilingualism into educational activities. The authors concluded that multimodal, multilingual composition in book-creation apps offers opportunities to include multilingualism in teaching.

Sofkova Hashemis's (2017) study, which was conducted in a Swedish context, is closely related to the research presented in this article. The author examined the communication patterns and digital meaning-making processes of students 7–8 years old in the subject of Swedish language. Sofkova Hashemi used a social-semiotic framework to incorporate **the understanding of the students' choice of media, modes, and other semiotic resources** in their compositions. The **results indicated that students' meaning-making** was characterized by the affordances of the available technology.

4. Methodology

4.1. Research design

In the present study, a qualitative ethnographic case study design was applied. This design afforded the exploration of meaning-making activities in SSL as a situated and social activity. The case study was designed to determine the complexity and situatedness of digital meaning-making in learning Swedish as a second language (Cohen, Manion & Morrison, 2011, p. 128). The study was conducted during the spring of 2018. The empirical material consisted of classroom observations, field notes, voice recordings, transcriptions, photographs, and one-to-one teacher interviews. The data collection was conducted over a period of five months, which included approximately 15 hours of empirical data collection and three hours of one-to-one teacher interviews at each of the three schools.

4.2. Participants

Four teachers at three schools in a large city in Sweden participated in the study (see Table 1). The schools were chosen based on the criterion that they had a high proportion of newly arrived students. The participants at each school were primary school SSL teachers and students. Using Swedish criteria (see Footnote 1 above), the teachers categorized nine students as newly arrived. The students gave their verbal approval, and their parents provided informed consent to allow them to participate in the study. The participating students had lived in Sweden from only a few months to 2.5 years. Their levels of Swedish language fluency varied from the limited ability to express themselves to relying on Swedish in most classroom activities. At the participating schools, the SSL subject was integrated in the subject of Swedish, which is a common practice in Swedish primary schools. At the participating schools, 80–90% of the students were categorized

as second language learners of Swedish because they spoke another language in their home environment.

All newly arrived students in the participating classes were included in the integrated **Swedish/SSL classes. The teachers adapted all teaching to the students' individual literacy** development; therefore, the students sometimes worked at different tasks, but the newly arrived students were included in peer work with their classmates. The students often shared languages in addition to Swedish, such as Arabic and Pashto. If the participants did not have a common language, they used Google Translate.

Table 1. Participants

School	Teacher		Student		
	Assumed name	Grade	Assumed name	L1	Time in Sweden
The Square School	John	3	Khobaib	Pashto	8 months
			Valentina	Albanian	2 years
			Aadila	Turkish	2.5 years
The Rectangle School	Fatima	1	Zeb	English	2 months
The Circle School	Martina	1	Pjotr	Russian	1.5 years
			Fabian	Croatian	1 year
			Laura	Arabic	6 months
	Ulla	2	Inyat	Pashto	3 months
			Ali	Arabic	4 months

4.3. Observations

The fieldwork consisted of observations of the media (i.e., tools and materials) and the modes (i.e., writing, gestures, speech, images, and the digital textual or visual language) (Kress & Van Leeuwen, 2001). The distinction between modes and media was necessary because the observed media contained several modes, which affected what was expressed (Flewitt, 2011). The first author of this paper performed all the observations and documented the multimodal observations in voice recordings, ethnographic notes, and visual documentation of the interactions with digital devices (see Table 2).

4.4. Interviews

The interviews with the teachers, which were conducted by the first author, took place in connection with the observed lessons. The researcher first asked for general information about the observation. Based on the response, the researcher asked structural questions (see Appendix 1) to explore the teachers' perceptions and understanding (Westby, Burda & Mehta, 2003). Each teacher was interviewed three times. The interviews lasted from 20–45 minutes. During the interviews, informal discussions occurred frequently, which constituted part of the fieldwork. After the interviews and field notes were transcribed, the teachers had an opportunity to read and clarify them. No additions to the transcripts were made.

Table 2. Data in the study

Direct Observation	
Description	Non-participant observation of the setting of the classroom activities occurred during start-up and at least one observation
Documentation	Documented in field notes, including multimodal transcriptions, photos, and audio recordings of the newly arrived students' group and individual activities
Participant Observation	
Description	Active role in classroom activities; interacting with students and teachers
Documentation	Documented in field notes, multimodal transcriptions, photos, and audio recordings
Interviews	
Description	Focused teacher interviews structured as guided conversations
Documentation	Documented in audio recording and transcripts
Physical Artifacts	
Description	Student texts, computer printouts, screen shots, student booklets, photos of ornaments in the classrooms
Documentation	Documented in photos or copies of documents
Documents	
Description	E-mail correspondence, meeting agendas, formal studies, news clips
Documentation	Documented in photos or copies of documents

Source: Adapted from Yin (2009)

4.5. Analysis

We used a thematic analysis to search for themes and patterns in the data (Braun & Clarke, 2006). All three authors contributed to the analysis, which consisted of five phases:

- Phase 1: Familiarization with the data. This step included no coding of data, and the data were processed reflexively.
- Phase 2: Creation of initial codes and organization of the data into meaningful themes.
- Phase 3: Codes were combined into initial themes by identifying common patterns among the codes.
- Phase 4: The themes were reviewed and reworked to fit all the data extracts.
- Phase 5: Defining and naming the themes.

All the excerpts and examples were originally in Swedish and are translated to English. The following table (Table 3) describes the final themes.

Table 3. Description of final themes

Final Theme	Explanation	Examples
Being your own architect	Learning with digital devices was created by letting the students come to their understanding of the activity and developing it in their way, in dialogue with others or on their own. Teachers functioned as a dialogue partner rather than an instructor.	<p>Khobaib: "I want someone who is skiing."</p> <p>John: "Skiing ..." (helps to look through the pictures)</p> <p>John: "Explore it in your way. I am not the expert; it's you."</p> <p>Ulla: "What are you two guys doing? Oh, I see that you have found your way of solving the task. That's exciting. Keep going."</p>
Spaces for translanguaging	<p>Groups used digital devices for communicating and meaning-making. Focus was on providing opportunities for translanguaging.</p> <p>The students used multimodal resources enabled by the digital devices in the meaning-making, e.g., Google Translate</p>	<p>"Fatima, it's hard to collaborate with Zeb.</p> <p>He does not know much Swedish."</p> <p>Fatima: "Then you two have to figure out something together. You know some English, don't you?"</p> <p>Martina: "Well, you guys can discuss in Arabic. Laura must be involved in the activities."</p>
Learning through recreation by re-creation	To re-create the activities students had previously participated in, they used digital devices, often by copying existing texts. The focus was on re-creating the content and using only the Swedish language. The typical structure of the digital technology was as follows: 1) photos at the Smartboard from the activity in full class; 2) writing a shared text on the Smartboard with speech synthesis enabled; 3) the students created their digital text (the newly	<p>Ulla: "Here is a photo of you, and this is the text we wrote together. I want you to look at the text and try to write it down on your computer. Start with opening the IntoWords application."</p> <p>Martina: "I know it's hard for you guys to write a factual text about the caterpillar, but you can take Elsa's text and try to copy it. Help each other."</p>

arrived students copied the shared text with IntoWords activated)

5. Results

In the thematic analysis, we identified three key themes. These themes were used to determine the understanding and framing of meaning-making among all the participants. The themes were as follows: (a) being your own architect; (b) spaces for translanguaging; (c) learning through recreation by re-creation. The boundaries between the themes were sometimes fluid and overlapping. However, in this interpretation, understandings, beliefs, and activities are not isolated concepts but correspond to each other (Braun & Clarke, 2006).

5.1. Being Your Own Architect

In all the participating classrooms, the students were content creators in meaning-making activities. One reason was that the teachers did not always have access to different functions of the technology; instead, they encouraged the students to make meaning according to their own designs and discoveries. In these activities, the digitally mediated meaning-making activities were exploratory. In this study, exploratory meaning-making was defined as meaning-making to let the individual connect the outer world with his/her inner world (Lee, Son & Settle, 2016). When the teachers reasoned that this kind of activity was part of their teaching, they referred to conceptual changes in the roles of teachers and students.

My role is different partly because I am a bit unfamiliar with some of the new technology. Sometimes I tell the students, "Yes children; now we will see what happens if I press this button."

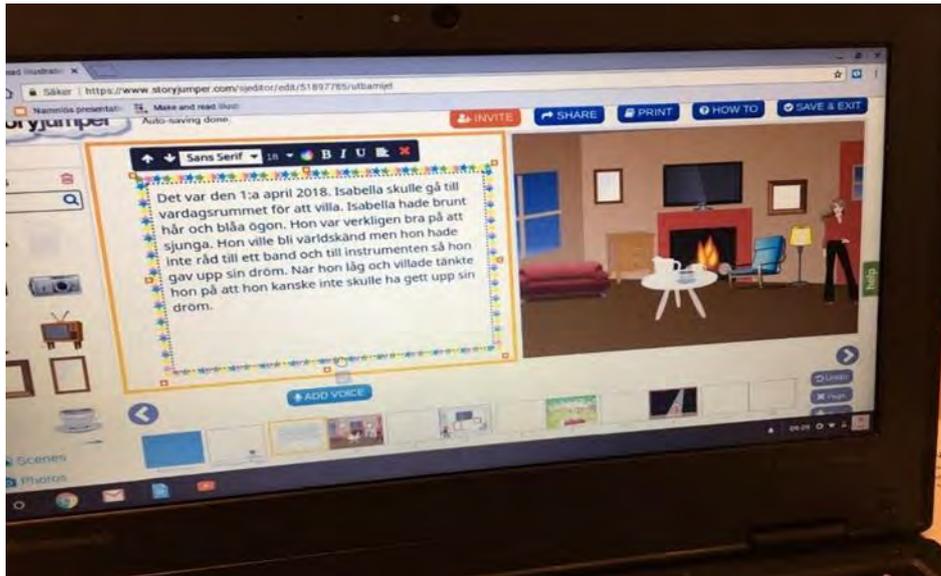
Ulla

The teacher acknowledged a change in the orchestration of the classroom, in which the teacher learned with and from the students. They articulated the change as beneficial for **students' creativity** and self-confidence. The teachers saw their role as changing because of their uncertainty in using the new technology. The new technology enabled an exploratory approach to teaching, which the teachers regarded as beneficial for the students and which promoted student agency.

I think that they [the students] also become very confident quite quickly and needed less help. I believe that they can work more.... I think it will be a more creative process and that it is easier to be somewhat project oriented.

John

The teachers emphasized that images were particularly crucial in exploratory digital meaning-making because they supported students in expressing richer content in their writing. In the observations of exploratory digital meaning-making, it was noted that the abundant access of images enabled the newly arrived students to draw on their own **experiences and dreams using digital technology as the mediating tool**. Aadila's (see Figure 1) text provided additional information and complemented the created image. For instance, the students tended to start by creating pictures, which allowed them to connect to their interests even though they may not have known all the words in Swedish. The **students' inner worlds were negotiated and anchored in both the images and the arrangements in StoryJumper**. For example, during text creation, Aadila talked about the environment she designed: *I want to live like this when I grow up. It is beautiful. A villa with many rooms. [...] I like singing as well.*



It was April 1, 2018. Isabella would go out to the living room to rest. Isabella had brown hair and blue eyes. She was really good at singing. She wanted to become world famous but she could not afford a band or instruments so she gave up on her dream. When she rested, she thought she might not have given up on her dream.

Figure 1. Aadila's Story Created in StoryJumper (translated by the researchers).

5.2. Spaces for translanguaging

According to this theme, the use of digital devices facilitated translanguaging and opportunities for the students to express themselves using different modes and languages. When the translanguaging approach is used in teaching, multilingualism becomes a potentially empowering factor that teachers can strategically use to encourage **students' multilingual resources (García, 2009)**. The visual material displayed on the computer is an example of digital technology supporting translanguaging. All teachers provided similar activities that involved digital meaning-making, in which the students were encouraged to write and talk using all their linguistic resources. When they worked with peers who spoke the same mother tongue, the students used their L1 to discuss Swedish texts. In some classrooms, the students initiated ways of using technology to create spaces for translanguaging, and sometimes the teacher took the initiative based on the pedagogical purpose.

Ulla used translanguaging strategies in teaching, which is illustrated in Figure 2. Ali wrote Swedish sentences on the laptop about what he found in the classroom. The worksheet, designed by Ulla in collaboration with the L1 teacher, contained sentences in both Arabic and Swedish. As Ali wrote, IntoWords read the sentences in Swedish, and Ali pronounced them in Arabic. Ulla could not speak Arabic, but she repeated what Ali said. They both giggled when Ulla tried to pronounce the Arabic words.

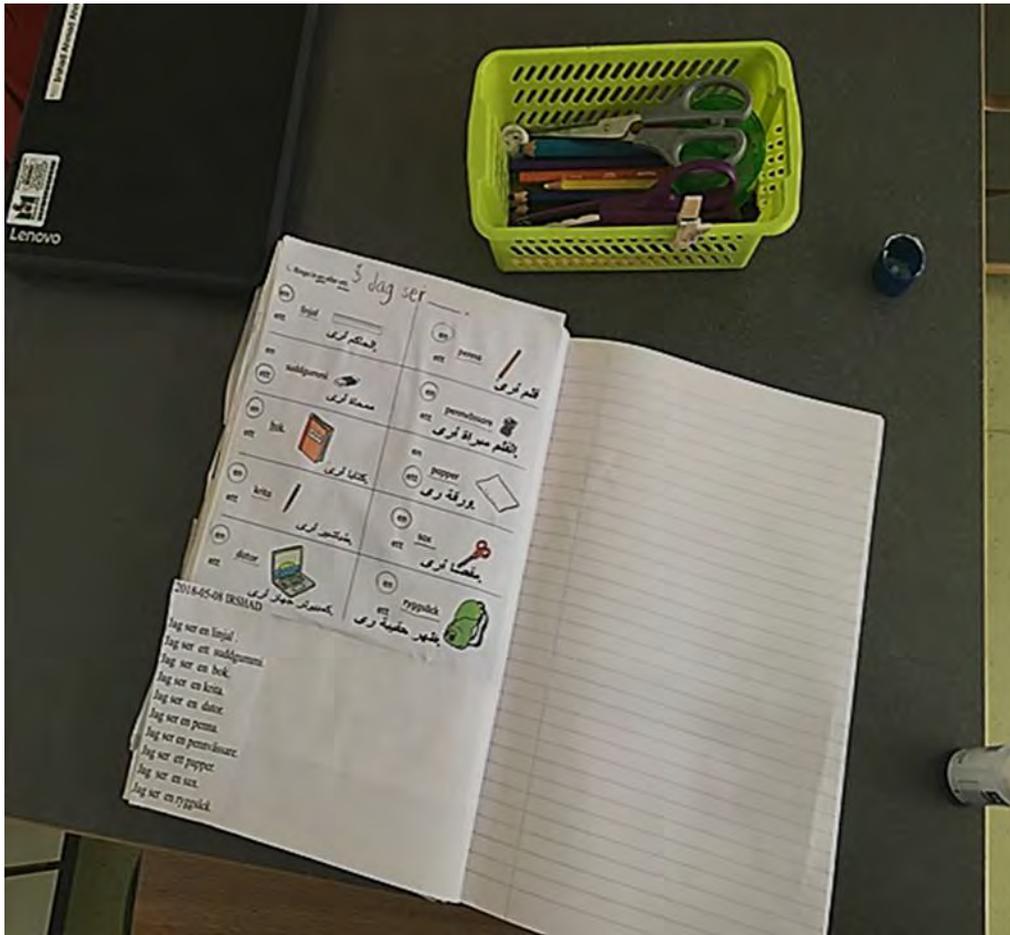


Figure 2. Worksheet Designed by Ulla and the Arabic language teacher.

In another example of translanguaging, in which the teacher promoted the use of technology, Zeb wrote about his home. Fatima instructed Zeb to write his text in his L1. She explained in the interview that this was partly because Zeb was newly arrived and partly because he was at the very beginning of his literacy development. Fatima wanted this development to occur in parallel with both his languages. Zeb used IntoWords when he wrote in English, and the word suggestion feature supported him when he struggled (see Figure 5). When he finished his text, he used Google Translate to translate it into Swedish (see Figure 6). Finally, he read aloud, first in English and then in Swedish.

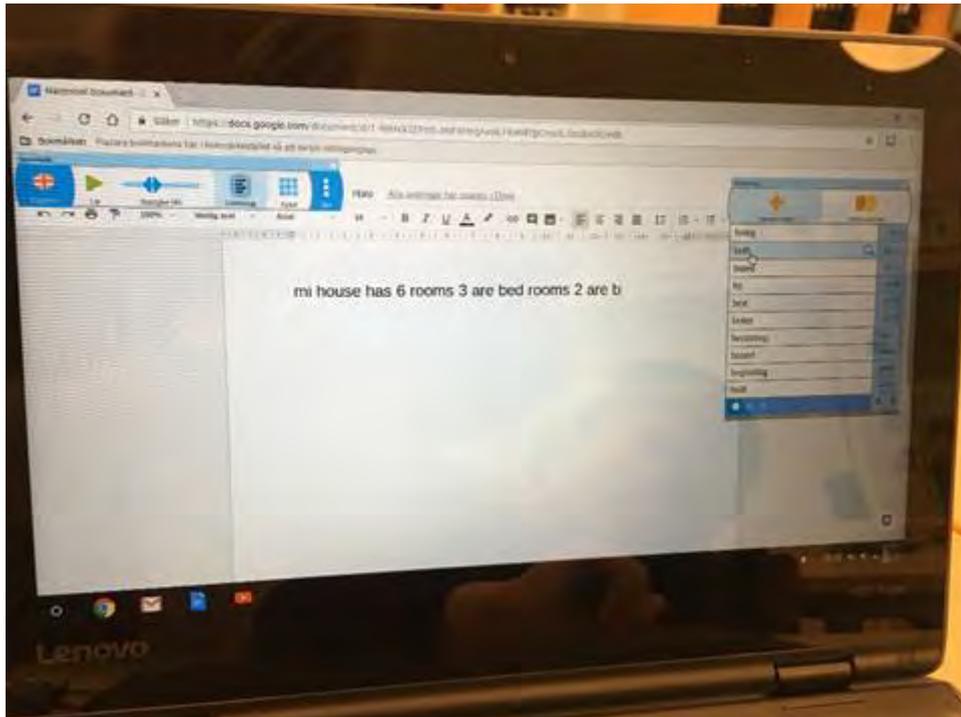
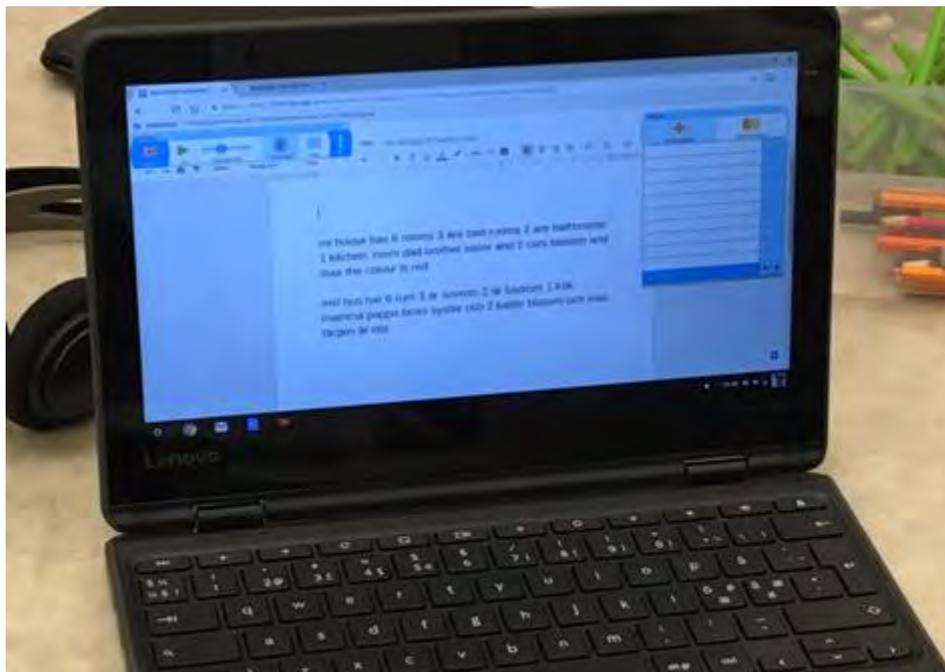


Figure 3. Zeb Writing in English.



mi house has 6 rooms 3 are bedrooms 2 are bathrooms 1 kitchen. mom dad brother sister and 2 cats blasm and max the color is red

Mitt hus har 6 rum 3 är sovrum 2 är badrum 1 kök. Mamma pappa brorsyster och 2 katter blasm och max färgen är röd

Figure 4. Zeb's story in English and in Swedish.

An example of a student-based initiative in digital translanguaging in peer work was the process in which Laura and her classmate used Google Translate to collaborate. They wrote sentences in Swedish about what they wanted to do during Easter. Laura used the voice function in Google Translate to translate the sentences into Arabic. They were frustrated because they wanted to write sentences on the computer in both languages, but the keyboard did not allow them to do so. The students were so used to being supported by the technology that they were surprised and frustrated when the technology limited what they could do.

In several cases, the students communicated in English as well as in Swedish and their mother tongue. When the students did not speak the same language, there was usually an element of English in their communication. The students were frequently reminded by the teachers to try to find a way to collaborate and include everyone in the discussion. For example, when the students wrote in pairs, they sometimes used more than two languages in the conversation, which was encouraged by their teachers. An example is the collaboration of Ali and Inyat, who spoke different first languages. By using body language, they agreed that the English word "swim" is what the boy did in the sea. When they talked to Ulla, she told them that "swim" is *simma* in Swedish.

5.3. Learning Through Recreation by Re-creation

In this theme, the main point was that the students used digital technology to re-create something that had happened, such as an excursion, and they wrote about their experiences in Swedish. Embodied experiences that were linked to authentic situations were highlighted as an anchoring factor of meaning-making. Three of the teachers expected to reward benefits for language learning if the students first participated in activities and then wrote about them in Swedish using IntoWords.

All the pictures I take on our excursions make it easier for the newly arrived to write texts. When we write texts about our excursions, I can point on the picture and then it will be easier for the newly arrived students to follow because they have actually been there.

Ulla

I really believe in this [writing texts about physical experiences] because I am passionate about it, that they work hands-on. I am starting from the children's world. It gets very basic and concrete.

Martina

Some teachers mentioned that they were struggling with how to best integrate the newly arrived students in the SSL activities. All the teachers mentioned that the digital tool IntoWords was very useful for the newly arrived students. Ulla explained how she was afraid that others would think that she was being counterproductive when she let newly arrived students copy texts:

If you think of Inayat, he cannot write such a text himself and what I usually do is when we have written a text together [about an excursion] is printing it, and then he can copy that text. You might think, "Yes, but then he can just paste it." But IntoWords enables him to hear every letter he writes, and then he gets a direct connection to the letter's sound, and that is a huge advantage.

Ulla

According to Ulla's reasoning, real experience, such as an excursion, is a sound basis for learning to write a text. Moreover, connecting a practical experience to a digital activity was regarded as creating authenticity when the students worked with digital technology.

6. Discussion

This article began with a discussion of how the changed conceptual understanding of language has moved toward an understanding of language as created in a complex dynamic of identity, ethnicity, class, and gender, which are framed by the broad political context (Block & Cameron, 2002). Frameworks of translanguaging and multilingualism **have been found useful in understanding young people's digital meaning-making** (Honeyford, 2013; Pacheco & Smith, 2015; Zapata et al., 2015). However, newly arrived **students' digital meaning-making** in school has not been sufficiently explored. Therefore, this study was focused on examining **newly arrived primary school students' opportunities** to create meaning, communicate, and express themselves using digital technology in SSL taught as a subject in three urban Swedish schools.

The results of this study contribute to understanding how the orchestration of teaching **establishes a framework for students' meaning-making** using digital technology. The technology was used for various purposes: communicating in a digital environment with images as a point of departure; enabling peer work with Google Translate, and enabling the retelling of experiences by the access to different modalities. Previous studies (Honeyford, 2013; D. W. Rowe & Miller, 2016; Zapata et al., 2015) highlighted the fact that multimodal digital text creation enabled multilingual students to discuss and express their multilingualism. The findings of the present study build on the previous research by showing the central role of orchestration in meaning-making through computer-assisted language learning. The orchestration of teaching not only creates various methods for the use of digital technology but also facilitates activities in which the students take the leading role when they create meaning.

Characteristic of the three themes established in the study was that the newly arrived students used digital technology strategically when they engaged in meaning-making activities with peers and teachers. Both students and teachers initiated activities in which **digital technology was used to develop the students' multilingual skills. The three themes** provided a demonstration of the **individual's ability to use language-supportive technology** successfully in specific contexts and for identified purposes.

The first important finding in this study is that digital technology offered opportunities for exploratory meaning-making when the orchestration of teaching left room for the agency of newly arrived students. By being their own architects, the students took the initiative in decision-making in computer-assisted language learning. Moreover, the teachers saw themselves as architects when they explored the technology with their students. Researchers in translanguaging have found that language is dynamic and changeable (García & Kleifgen, 2019; García & Wei, 2014). Orchestrating teaching that allows individuals to use digital technology to discover languages in exploratory meaning-making opens spaces for translanguaging.

Second, while the students in this study were supported by digital technology, they initiated meaning-making practices in which translanguaging was reflected in their self-initiated meaning-making practices. The students acknowledged the learning demands that SSL teaching placed on them. Moreover, their collaboration with peers in digital learning activities enhanced their participation in both speech and writing. In this study, the translanguaging aspect constituted a method of supporting both the essential development of literacy and maximized the linguistic potential that newly arrived students bring to their classrooms.

The third, and to some extent unexpected, finding was that the teachers in our study ensured that students were given a broad repertoire of multimodal expressions to **promote their digital literacy. The concept of multimodality draws attention to "meaningful bodies, environments and structures"** (Dicks, Soyinka & Coffey, 2006, p. 83) co-occurring in meaning-making. That is, meaning-making occurs not only through words and texts; **students' body language, the environment in which they participated, and the context, all** carried meaning. This finding may have emerged because the teachers wanted to conduct teaching that the newly arrived students could recall and place in a context. Moreover, they integrated the positive aspects of their engagement with digital technology into these

activities. Instead of changing teaching methods significantly, the teachers incorporated language-supportive computer-assisted components into their usual activities. The teachers strived for authenticity in working with digital technology, and they chose pedagogical tasks **carefully to stimulate the pupils' willingness to learn things that were considered vital outside the language classroom** (Chapelle, 2001).

A recommendation for further research is the focus on the specific texts that newly arrived students create from an identity perspective. What opportunities are there for students to express their multilingual identity in their work with digital technology in learning a new language? The present study was set in a primary school context; it would be of interest to explore whether older students expressed their multilingual identity in text creation. If so, future research could explore the differences between age groups in the use of digital technology and in multimodal meaning-making. It is vital that teachers encourage students to express themselves, and texts are written in most subjects. An interview study with teachers of different subjects would shed light on the opportunities older students have to express their multilingual identity in different topics.

7. Limitations of the study

We acknowledge some limitations of our study. First, the second and third authors entered the collaboration when the initial coding had already been performed by the first author, which was not optimal. To ensure the reliability of the coding process, we revised all codes and held meticulous discussions. Second, none of the authors spoke the L2 languages (except English) spoken by the participants. For example, if we were proficient in Arabic, **we would have understood the students' discussions. However, our** focus was on their interaction with technology and translanguaging. Third, the study would have benefited **from including information about the students' previous experiences with technology at home and in their home countries.** However, we knew that all participants had been in the Swedish school system for at least a few months. In Sweden, most schools provide primary school students with either iPads or computers, which was the case in the classes where the data were collected. Thus, we knew that the students could manage the devices and software used in this study.

8. Conclusion

García and Kleifgen (2019) **emphasized the teacher's critical role in enabling** translanguaging through the use of digital technology and multimodality to create a pedagogy of sustainable literacy. This study demonstrated that how teachers orchestrate teaching in Swedish as a second language for newly arrived students has a decisive effect **on the students' opportunities to use their** multilingualism as an asset in making meaning by using digital technology.

Ethical statement

We have followed the Swedish Research Council's (2017) research ethics recommendations in all respects. All adult participants have signed an informed consent form and they have been informed that they have their full right to suspend their participation at any time. All the parents of the participating students have been informed through an interpreter about the study and both students and parents have given their written consent to participate in the study. All material has been stored securely and has only been used for research purposes.

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