

To What Extent is Studi/Binogi Consistent with the Research Evidence on Language Learning and School Achievement among Immigrant-Background Students?

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What Is Studi/Binogi?

Studi/Binogi is an online system developed in Sweden designed to support students in gaining access to and learning curriculum content. The system is called ‘Studi’ in Sweden and Finland, and ‘Binogi’ in other international contexts. Curriculum content is presented through 5/6-minute animated modules that are narrated both orally and in written form (subtitles) in multiple languages (see binogi.com). Students (or teachers) can choose the language in which they want to listen to the content, and they can also choose the language of the written subtitles. For example, Arabic-speaking immigrant students could access a mathematics lesson on ‘the common denominator’ in Fractions by listening to the lesson initially in Arabic with written support from Arabic subtitles. As their proficiency in the school language increases, they could access this content in the school language, or listen to the content in the school language while continuing to use the Arabic subtitles as a support for comprehension (see Figures 1 and 2).

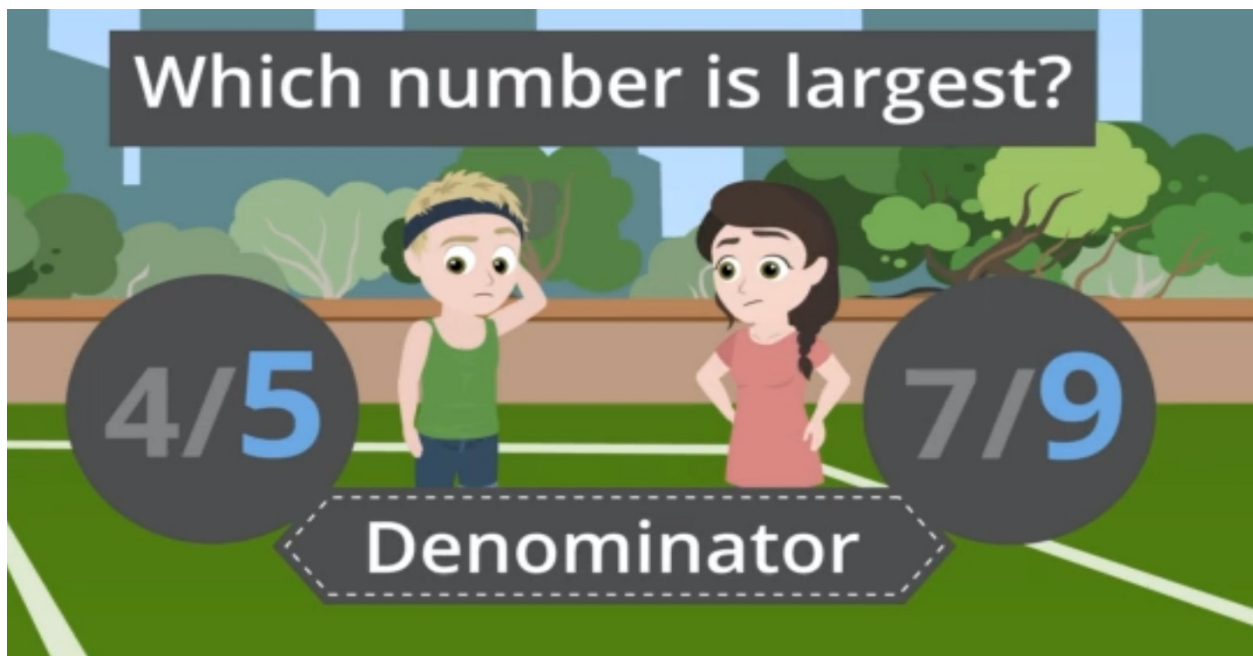


Figure 1. Screenshot of mathematics content (fractions)

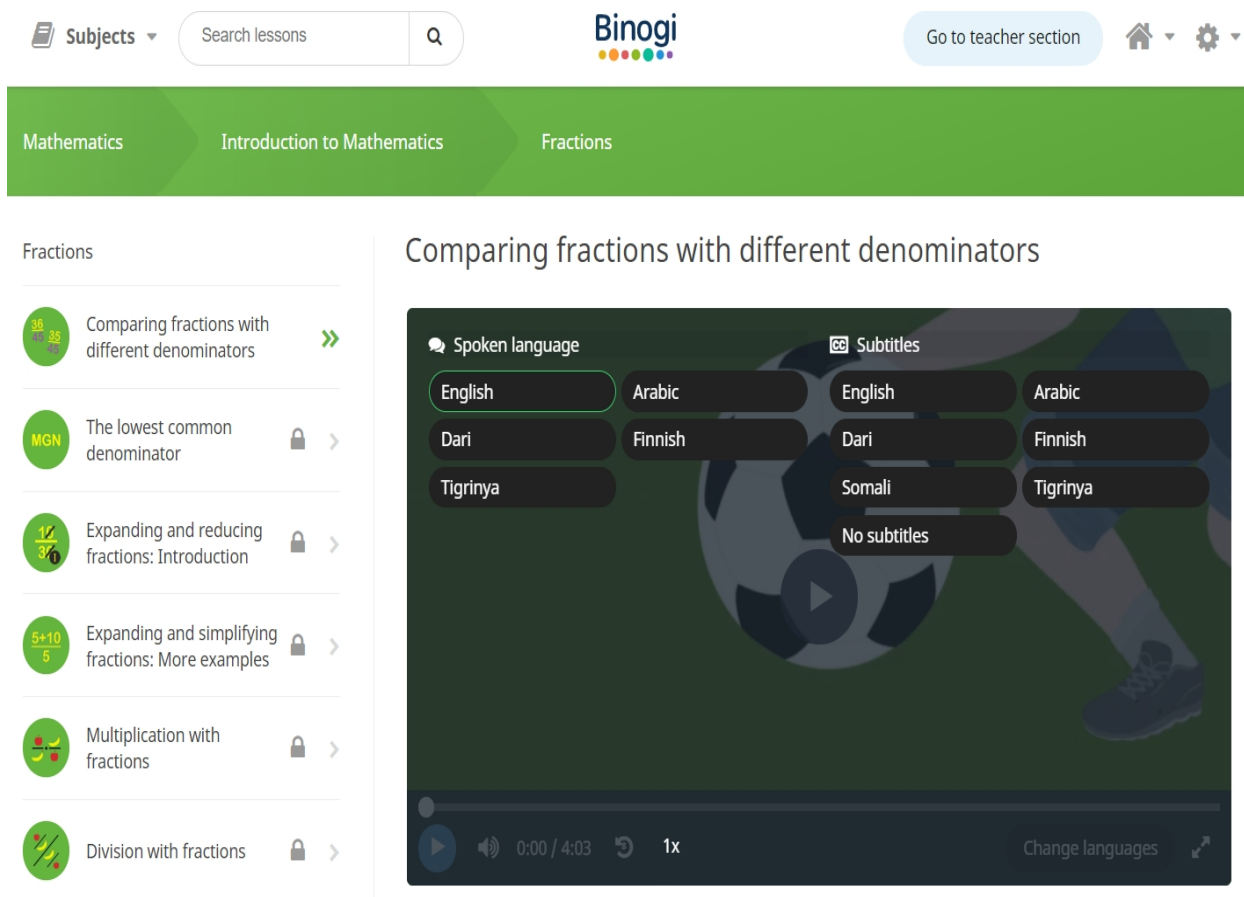


Figure 2. Screenshot of spoken and written language options

The language options vary for different content modules and are still in development. For example, in the Binogi ‘denominator’ lesson (Figures 1 and 2), the language options are: **Spoken:** English, Dari, Tigrinya, Arabic, Finnish; **Subtitles:** English, Dari, Somali, Arabic, Finnish, Tigrinya. Because of the influx of refugee students that Sweden and other European countries experienced in 2015 (and earlier), the Studi/Binogi developers prioritized the languages of these communities rather than more obviously ‘commercial’ languages (e.g., Chinese).

The lessons incorporated into Studi/Binogi cover most areas of the curriculum ranging from Sciences, Mathematics, Social Studies, and a variety of other subjects. The scope of Studi/Binogi can be seen in the partial list of subject matter and the specific Physics topics shown in Figure 3.

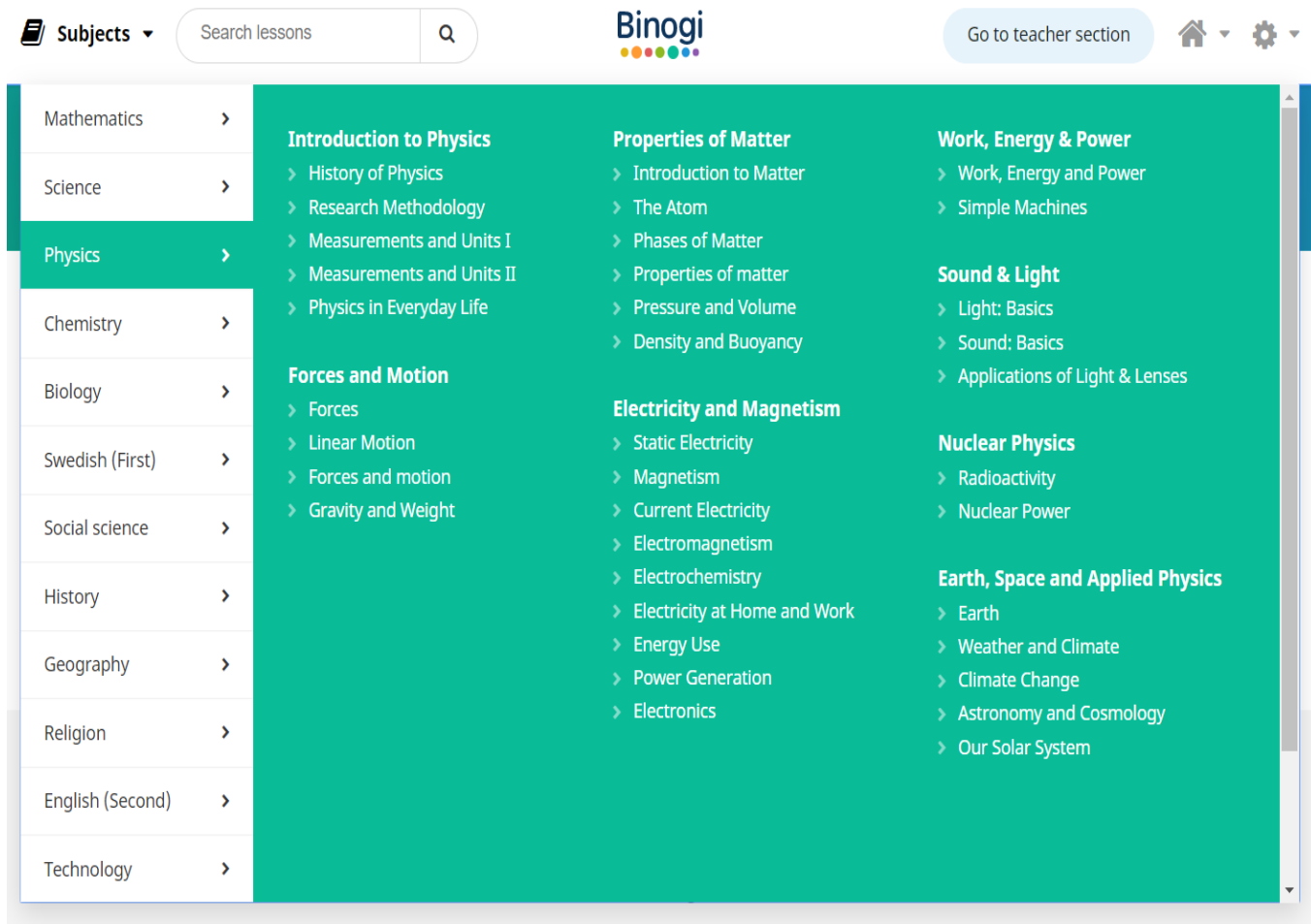


Figure 2. Partial list of subjects and Physics lessons

In summary, Studi/Binogi covers much of the common curriculum in western countries from the later grades of primary/elementary school (c. age 11, grade 5) and provides multiple access routes to enable diverse students to gain access to concepts and skills regardless of their current knowledge of the school language. The lessons are designed to be accessible both to students who are fluent in the school language and those who are in the process of learning it as an additional language.

What Is the Rationale for Studi/Binogi?

The initial rationale for Studi/Binogi was that curriculum content could be made more comprehensible and engaging for students by using video animations (derived from advances in gaming techniques) together with clear explanations and examples to create lessons that focused on a single concept within particular subject areas.

A second rationale was that this content could be presented orally and through subtitles in multiple languages in order to enable newcomer students whose knowledge of the school language was minimal to gain access to curriculum concepts and skills while they were learning the school language. Furthermore, this process would accelerate newcomer students' acquisition of academic skills in the school language because concepts and knowledge acquired in their home language (L1) could be transferred to the school language. The term 'translanguaging' has been used in recent years in Sweden and elsewhere to highlight the dynamic connections across languages and the importance of enabling students to make use of their entire linguistic, conceptual, experiential, and intellectual repertoire to support their learning.

Finally, the online nature of the Studi/Binogi system means that it can be used in flexible ways by the teacher to support students' learning. For example, it can be used in the following ways:

- To support classroom instruction for all students (e.g., the entire class might watch and listen to a lesson in the school language);
- To scaffold or support individualized instruction where students work through a lesson or lessons at their own pace using whatever language supports and assessment quizzes work best for them;
- To enable students (and other family members such as parents and siblings) to access the system from home either on computers or mobile phones and to reinforce their learning and 'time-on-task' outside the formal context of the school.

To What Extent Is this Rationale Supported by the Research Evidence?

Two sets of research findings are directly relevant to the Studi/Binogi rationale. The first concerns the nature of academic language and the length of time typically required by immigrant-background students to catch up academically to grade expectations. The second set of findings concerns the relationships between students' first and second/additional languages (L1 and L2) as they acquire bilingual and multilingual skills.

Multilingual students' academic learning trajectories

It has been well-established by research in various international contexts that multilingual students (a term that includes both newcomer students and immigrant-background students born in the host country) typically require, on average, at least 5 years of schooling (and sometimes much longer) to catch up academically to their native-speaking peers (e.g., Collier, 1987; Cummins, 1981a; Demie, 2013, 2018; Levin & Shohamy, 2008). Obviously, in many contexts, substantial numbers of multilingual students never catch up academically and drop out of school with minimal qualifications (e.g., OECD, 2016). Students often pick up everyday conversational skills more rapidly (1-2 years) because this language is characterized by high-frequency words, common grammatical structures (e.g., *active voice*), and is supported by face-to-face

interpersonal clues to the meaning such as gestures, facial expression, intonation, etc. Academic language, by contrast, includes many low-frequency words (e.g., *photosynthesis*, *inference*, etc.), less common grammatical structures (e.g., *passive voice*), and is found primarily in only two contexts: classrooms and written text (including textbooks).

This typical 5+ years academic catch-up trajectory means that multilingual students in countries around the world are primarily being educated in mainstream classrooms rather than in specialized or preparatory classrooms taught by teachers with specific expertise and qualifications in teaching additional languages. This reality results from the fact that specialized language support, where it is available, attempts to address the immediate needs of newcomers but is unlikely to last more than 1 or 2 years, after which time the student is taught within the mainstream classroom by teachers who may have had little opportunity to acquire expertise in language teaching instructional strategies. Thus, many multilingual students are likely to continue to struggle with the academic language demands of content subjects for several years after specialized language support has ended.

Studi/Binogi addresses this problem by providing grade-appropriate curriculum content to multilingual students in a form that they can potentially understand. Meaning is communicated by the video animations that enable students to ‘see’ the concepts, by the combination of spoken and written language input, and through the use of students’ L1 together with the school language. All of these supports enable multilingual students to become more autonomous and to take greater control over their own learning. This autonomy is reinforced by the quizzes that accompany each lesson, which enable students to monitor their progress and understanding of the lesson content.

Cross-lingual relationships in academic learning

Extensive research has demonstrated positive relationships between students’ L1 conceptual development and their level of attainment in the school language (e.g., Cummins, 2000; Edele & Stanat, 2016; Thompson, 2017). What this means is that concepts, knowledge, and skills developed in students’ L1 can be transferred to their L2 (the school language) when this process is encouraged by the school. If the school ignores the L1 fluency and literacy that multilingual students bring to the school, then cross-lingual transfer is unlikely to take place or will happen in a haphazard and inefficient manner. Cummins (1981b) synthesized the research findings by proposing that L1 and L2 academic concepts, knowledge, and skills are *interdependent* in the sense that there is a *common underlying proficiency* that enables two-way transfer across languages (Cummins, 1981b):

To the extent that instruction in L_x is effective in promoting proficiency in L_x, transfer of this proficiency to L_y will occur provided there is adequate exposure to L_y (either in school or environment) and adequate motivation to learn L_y. (p. 29)

In other words, although the surface aspects (e.g., pronunciation, fluency, etc.) of different languages are clearly separate, there is an underlying knowledge base that makes possible the transfer of concepts, literacy skills, and learning strategies from one language to another. The common underlying proficiency is represented visually as a ‘double iceberg’ in Figure 4.

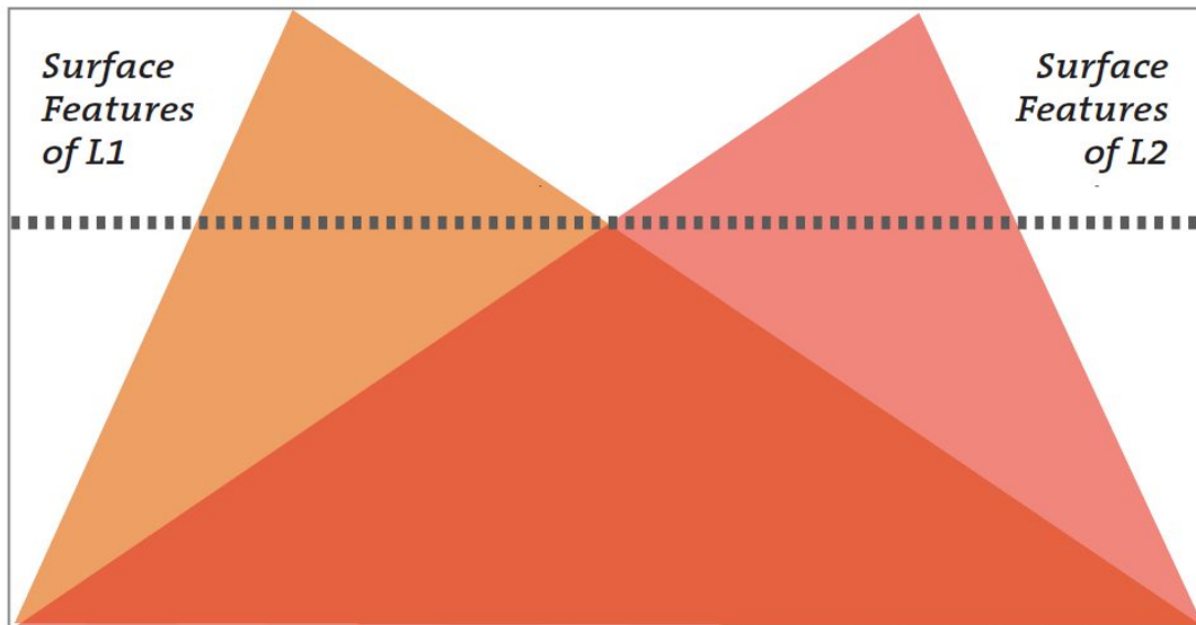


Figure 4. ‘Double iceberg’ representation of the common underlying proficiency

The major impediment that many multilingual students experience in succeeding academically is that they have very little opportunity to develop their conceptual knowledge of curriculum content in either their L1 or the school language. They don’t understand enough of the school language to acquire complex content communicated through that language. Students’ difficulty in understanding instruction is likely to be exacerbated in many contexts by the fact that mainstream classroom teachers have not had opportunities to develop expertise in supporting second language learners through scaffolding strategies and other instructional techniques. This process often becomes a downward spiral because as students fall further behind in their understanding of subject matter content, subsequent lessons become even less comprehensible to them.

In terms of L1 academic development, most schools have no way of presenting content in multilingual students’ home languages and thus academic input into the common underlying proficiency through this channel is also blocked.

In short, in mainstream classroom settings, when students don’t already understand a concept, and also don’t sufficiently understand the language of instruction, they are likely to experience

considerable difficulty both in learning academic content and also learning the language through which this academic content is expressed. However, when students already understand an academic concept (e.g., *photosynthesis*, *democracy*, etc.), it becomes easier to infer the meaning of the L2 instruction and to learn the language of instruction. This is why newcomer students who enter the school system with strongly developed literacy and conceptual skills in their home languages often succeed well in catching up academically in L2.

Studi/Binogi addresses the problem of curriculum access by providing academic content to multilingual students in both the school language and their L1. Thus, input in both languages contributes to the development of conceptual knowledge. Additionally, the video animations and the dynamic relationship of transfer between the two languages enhance overall conceptual development in a variety of ways: (a) the animations, in themselves, represent much more powerful and engaging scaffolding than the static visuals of typical textbooks; (b) as students develop an understanding of the concept through the L1 lesson, this makes the L2 content of the lesson in the school language significantly more comprehensible; (c) as students ‘translanguage’ between the L1 and L2 content in Studi/Binogi, their awareness of language and understanding of the academic content increases.

Conclusion

The essential characteristic of the Studi/Binogi system is that content modules on specific areas of the curriculum are presented through engaging video animations and students can choose whether to listen to the content and read the script in either their home language or the school language. Thus, the system provides support for content learning and cross-lingual transfer not only during the initial L2 acquisition process but also during the extended catch-up period during which students are being taught in mainstream classrooms without additional linguistic support. In short, Studi/Binogi provides linguistic and conceptual resources designed to enable multilingual students to expand their knowledge of curriculum content and the increasingly complex L2 academic language in which this content is expressed.

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