# Language Learning Through Zoom:
## The Need for Pedagogical-Technological Knowledge

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## ABSTRACT

Attributable to the COVID pandemic, Zoom has become one of most widely used digital tools for online interaction. Schools and universities had to transition to wholly online teaching, and Zoom was one of the platforms used for real-time sessions. Therefore, it is necessary to investigate students' experiences of using tools like Zoom to see the positive and negative sides of videoconferencing for language learning. Students' and teachers' digital competence is an important factor that impacts online learning, and therefore students' experiences are analyzed in relation to the TPACK framework, which looks at teachers' digital competences and the intersections between their technological, pedagogical, and content knowledge (TPACK). It is found that especially the intersection between technological and pedagogical competences is sometimes lacking among teachers and is identified as the cause of a lot of negative experiences. Thus, the conclusion of this study is that such competences need to be developed by teachers.

## KEYWORDS

Zoom, TPACK, Survey, Language Learning, Video-Conference, Interaction, Language Skills

## INTRODUCTION

Zoom has become a well-used tool for conducting net-based teaching in all sorts of contexts because of the COVID-19 pandemic. The pandemic caused a very fast switch-over by instructors, from mostly face-to-face to entirely net-based teaching, and has made research into net-based teaching vital. Language teaching has been an area of particular focus for such research given the long-recognized need for interaction as a prerequisite for language learning (cf. Vygotsky, 1978).

The affordances of videoconferencing in general have been the subject of much research, for example, noting different uses of the separate modes of communication (Messina Dahlberg, 2015; Tan et al., 2016). As Dafgård (2020) noted, there are different ways of interpreting the term *videoconference*. Here, we take it to refer to synchronous interactive learning environments like Adobe Connect or Zoom, which combine video, text chat, and a whiteboard in the same virtual space.

Research has looked at student attitudes to net-based language education through tools such as Adobe Connect (White, 2020) and the Open University's FlashMeeting (Berglund, 2009), but not so much with Zoom yet, although some recent postpandemic studies are herein reported. Therefore, to identify what digital competencies instructors need, it was decided to carry out a study on Zoom, focusing on the attitudes and experiences of students in net-based English courses at a Swedish university.

Instructors need a variety of types of knowledge when making pedagogical decisions about how to implement net-based education. One such description of this body of knowledge divides it into technological, pedagogical, and content knowledge (TPACK), where these categories intersect with one another (Koehler & Mishra, 2005; Mishra & Koehler, 2006). Such a division is used in this study to analyze comments by the students and see which different competencies are mentioned and thereby seen as important. As an additional consequence, we can also evaluate the TPACK framework for identifying instructor competencies.

Students at different levels of undergraduate net-based English studies (first to third semesters) and students in an MA program in applied English linguistics were contacted through the course webpages in the Blackboard Learning Management System, and a survey of their attitudes to net-based language learning in Zoom, including comments on their experiences, was administered through Office 365 Forms. (*Net-based* is the common term used at this university to refer to courses conducted online involving synchronous online sessions, and so this is the term used in this article.) We start with some theoretical background, as well as a description of the Zoom platform.

## BACKGROUND ON LANGUAGE LEARNING IN NET-BASED ENVIRONMENTS

### Videoconferencing and the Learning of Language Skills

Language skills have been analyzed in much research on net-based education. A fundamental question is whether speaking and listening skills, in particular, can be developed in such environments. Research has reported somewhat mixed results, in fact, and there are both positive and negative conclusions in the literature. Among much research, Strawbridge (2021) investigated through video etandem (electronic tandem language learning) exchanges how synchronous computer-mediated communication facilitates interaction. Interaction is a positive affordance of synchronous computer-mediated communication, but there needs to be an explicit focus on language form as otherwise it is easily forgotten. Decker and Beltran (2016) investigated how students experienced net-based courses. Their conclusion is that collaborative interaction seems not so difficult as for face-to-face teaching since net-based students can edit contributions before sending them in text form.

Satar (2020) discussed the use of multimodal audiovisual resources for meaning making, thereby enhancing learners' social presence in a videoconferencing environment, ooVoo. Learners can make use of many resources owing to the multimodality of videoconferencing, which enriches their communication. In the community of inquiry framework (Garrison et al., 2000, 2001, 2010), different types of presence are identified that are key factors for success in online education. As well as social presence, which is enhanced through interaction, teacher presence was illustrated by Semingson et al. (2018) as the design of a course and the management of interaction (p. 5). Thus, the teacher plays a vital role in encouraging interaction between learners, among others.

On the negative side, interference by technology is a hinderance to learning and was especially mentioned as a problem for videoconferencing environments (cf. Hung & Higgins, 2016, and Trinder, 2016). This was clearly found in an analysis of student attitudes toward language learning through the Adobe Connect videoconference environment in White (2020). The results there demonstrate that, even though the environment is good for language learning, interaction can be disrupted due to technology problems and that, even if only one student has connection and sound problems, it can disturb the learning experience for all students.

Wigham and Satar (2021) carried out a study on lessons conducted through Skype. The instructor is shown to demonstrate a greater level of engagement with the material and students in the video mode available in Skype, but this raises the question of how to develop instructor competencies in multimodal language teaching. This is an important point that we address later in the analysis.

Lenkaitis (2020) investigated the specific case of Zoom used for teaching L2 (second-language) Spanish through telecollaboration. It is the videoconferencing environment that enables them to develop autonomy, the students report, and enables synchronous interactions. Interactions can take

place both with and without the presence of the teacher, which promotes independence and autonomy. Their language skills develop, and they are not afraid to use a variety of linguistic structures in interaction with instructors or peers.

Student attitudes to learning through Zoom have been studied. For example, Serhan (2020) investigated the attitudes of university students in the United States toward using Zoom during the COVID-19 pandemic. The students are negative about their learning experience, even though they recognize the flexibility Zoom classes offer and the interactive possibilities offered by the multimodal environment. They feel that their engagement in class is lower due to Zoom. Interaction is a real problem, as many students do not interact and do not have webcams on. While pedagogy was mentioned, it was not fully investigated, and this is a gap we aim to fill here.

Similarly, Nafisatul Mu'awanah et al. (2021) focused on English learning by Indonesian secondary school students. They prefer direct oral communication with the instructor rather than text chat. Fewer contact hours are a problem, as students feel bored and unmotivated to study by themselves. Technological difficulties like unfamiliarity with the software and connection issues cause many problems. As in Serhan (2020), Nafisatul Mu'awanah et al. (2021) did not discuss pedagogy, so this is something we focus on here.

Given the often-reported challenges of online learning, Peper et al. (2021) investigated "Zoom fatigue." This refers to the physical and psychological challenges of learning through any online platform, although it has become synonymous with Zoom due to the pandemic. The previous references also mentioned lack of engagement and boredom as reported problems, which come under the heading of Zoom fatigue. Peper et al. mentioned technological stress as well as social isolation, which are exacerbated by a purely online teaching situation. To some extent, these are individual issues that need to be addressed on an individual level, but pedagogy and course design can alleviate many problems.

Finally, Joia and Lorenzo (2021) looked at the shills that are taught during online courses and focused on the role of ICT (information and communication technology) in developing these skills. Freshman business students at university were surveyed who had courses via Zoom during the pandemic. Instructor digital competence is mentioned, as well as metacognitive support to follow student learning progress. Next, we turn to the TPACK framework for analyzing important competencies needed for online pedagogy.

## TPACK Framework

Koehler and Mishra (2005) and Mishra and Koehler (2006) presented a development of the original "pedagogical content knowledge" framework of Shulman (1986, 1987) to include technological elements. Seven aspects of teachers' digital competence are identified, defined, and described in Mishra and Koehler (1986, pp. 1026-1029):

1. Pedagogical knowledge – knowledge of methods and practices for teaching and learning
2. Content knowledge – knowledge of subject matter
3. Technological knowledge – knowledge of technology
4. Technological pedagogical knowledge – how teaching is affected by specific technologies
5. Technological content knowledge – how technology affects the subject matter and what can be taught
6. Pedagogical content knowledge – how pedagogy can be applied to teaching specific content
7. Technological pedagogical content knowledge – how technology and pedagogy intersect with the teaching of specific subject matter

Raygan and Moradkhani (2022) looked at the importance of teachers' attitudes to technology in the adoption of technology in the classroom, as well as the school climate in the form of technological support, resources, and infrastructure. Their study investigated attitudes among 209 Iranian EFL (English as a foreign language) teachers and identified weak but significant correlations between

their attitudes and technology integration, which entails that attitudes are an important precursor to TPACK in terms of ensuring technological integration. Mishra (2019) proposed the addition of an all-encompassing circle to the TPACK framework, which encloses the other three circles, and relates to contextual knowledge that has an effect on all other types of knowledge and their intersections.

Özgűr (2020) looked at the relation between technological stress and TPACK. Stress was reduced when there was more support from teachers' schools. Age is very much relevant here, in that older teachers reported being more stressed by technological environments. Valtonen et al. (2020) investigated the confidence of preservice teachers. Interestingly, technological integration was most strongly supported by the teachers, which indicates that they felt most confident about their knowledge of how to apply technology in the classroom. However, diversity and motivation were not strongly supported.

Saubern et al. (2020) in an editorial discussed the possible reimagining of the TPACK framework. In particular, they suggested a direct link between pedagogical and content knowledge since pedagogical techniques are inherently linked to the teaching of content. Thus, the main link is between pedagogical content knowledge, on the one hand, and technological knowledge, on the other, to leave an interaction with technological-pedagogical content knowledge. Crucially, the framework need not be fixed to the particular visual representation with a number of intersecting domains of knowledge; rather, the main point is how teachers integrate their technological competence to effectively teach certain content using particular pedagogical techniques. Part of the discussion in this study revolves around the intersections in TPACK and whether they are recognized in the comments by language learners. Finally, in this background section, we consider the set-up of courses and the Zoom environment at the university in focus in this case study.

## Pedagogical Set-Up at the Case Study University

Most courses at the university, which is the subject of this case study, are blended in that even courses with campus-based traditional-class forms use the learning management system Blackboard, known at the university as Learn (although at the time of writing it is being changed to Canvas). The crucial difference between these is that what are called net-based courses have their synchronous classes conducted through Zoom (introduced at around the start of the pandemic, replacing Adobe Connect as the seminar videoconferencing tool). A screenshot of the Zoom environment is shown in Figure 1.

The screen is divided into different areas. The main area to the left shows the participants by default, either with a camera feed or just a blank window as seen here. On the right, one can see a chat area. This and also other options, such as the participant list, are accessed through the options at the bottom of the window. If someone shares a document, then that document takes over the screen, and the participant images/windows are inset. There are also functions like breakout rooms where participants can be divided into smaller groups for independent work and for interaction with individual students.

## Summary of the Background and Hypotheses

Research in the area of videoconferencing shows a dual side of the environment. On the one hand, multimodality is seen as a positive affordance for language learning but, on the other hand, potential technological and pedagogical problems can create barriers to learning. Since Zoom has become a very common tool for meetings in general as well as in education, it is important to investigate users' attitudes to learning through the environment. Thus, this study examines the attitudes of learners to learning through Zoom. The focus is on instructors' digital competencies and how they are experienced by students. The simple hypothesis is that both pedagogical and technological types of knowledge are lacking in this digital environment, and that is the main reason for negative experiences by students.

**Figure 1. Screenshot of Zoom**
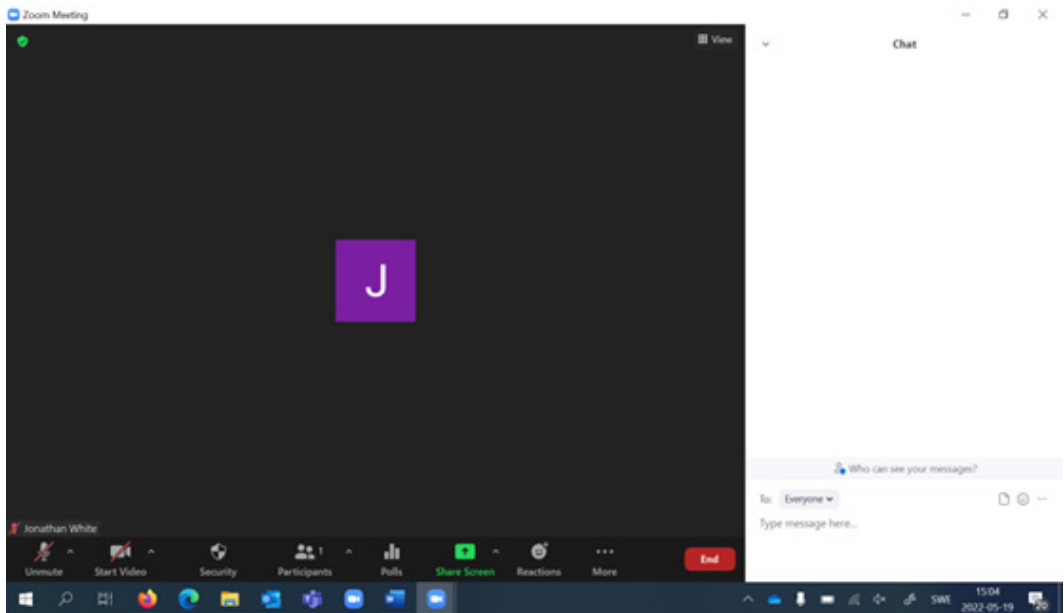


## METHOD AND MATERIALS

The survey was based on the survey used in White (2020) for Adobe Connect, and a link was sent by email to students in different net-based English courses at a Swedish university using Office 365 Forms. White (2020) also looked into attitudes to hybrid sessions, where both net-based and campus students are present in the same virtual seminar space. The focus is changed in this study to simply Zoom and does not take up hybrid classes at all. The questions can be found in the Appendix.

The analysis was mixed, with a quantitative analysis of overall ratings of satisfaction and attitudes to the development of language skills, and a qualitative analysis of the free-text comments based on the TPACK framework. All analysis was carried out by the researcher alone.

The students were undergraduate- and MA-level students taking courses in English. Four groups of informants were contacted by the researcher during 2020 and 2021. Informed consent was obtained, and they were sent the link from Office 365 Forms.

## RESULTS

A total of 117 informants completed the survey with none needing to be removed. The gender division is heavily biased toward female, with 91 self-reporting as female (77.78%), 23 males, and three nonbinary. In terms of the age of informants, 55 self-reported as aged 18-30, 51 as 31-45,10 as 46-60, and one as 61+.

### Language Skills in Zoom

We begin with informants' experience of developing different language skills in Zoom (The mean scores in Table 1 are calculated by assigning a score of 5 to 1 from most to least positive, and then dividing by the 117 informants.)

It seems that speaking skills are developed less compared to the results for listening and academic writing for Zoom. Only 79 out of 117 report evaluating the development of speaking skills as excellent

Table 1. Experience of developing language skills in Zoom

|  | Speaking | Listening | Academic Writing |
|---|---|---|---|
| Excellent | 20 | 31 | 26 |
| Good | 59 | 60 | 57 |
| Neutral | 24 | 17 | 24 |
| Poor | 13 | 6 | 9 |
| Very poor | 1 | 1 | 1 |
| Not answered | 0 | 2 | 0 |
| **Mean scores** | **3.72** | **3.92** | **3.84** |

Table 2. Experience of developing interaction in Zoom

|  | Students | Teachers |
|---|---|---|
| Excellent | 14 | 18 |
| Good | 43 | 59 |
| Neutral | 35 | 28 |
| Poor | 19 | 9 |
| Very poor | 6 | 2 |
| Not answered | 0 | 1 |
| **Mean scores** | **3.34** | **3.68** |

or good (67.52%). In comparison, 83 are positive about the development of academic writing (70.94%), and 91 for listening (77.78%). This very much supports the problems of interaction mentioned in other research, such as Tan et al. (2016), among others.

Regarding students' experiences of interaction, we find the results presented in Table 2.

We see a clear difference in the amount of interaction with fellow students and teachers, although the results for teachers are the same. Interaction is much more likely to happen with the teacher, and the same was reported by White (2020) for Adobe Connect. It, therefore, appears to be a general problem to encourage interaction with fellow students in net-based language learning. Zoom does, though, seem to be an environment where interaction with students is possible, as also supported by Lenkaitis (2020). This suggests that there is a need for instructors to encourage interaction between students specifically, which was mentioned in research before (e.g., Lenkaitis, 2020).

These results seem to support a somewhat negative picture of interaction and speaking even in a videoconferencing environment. The reasons for this are sought in the free-text comments, which are analyzed according to the TPACK framework.

## Themes in the Comments

Table 3 gives the frequency of different types of TPACK knowledge that appear in the data.

Note that the text comments are optional, and so informants can choose whether or not to supply one, and just over one-third supply an answer (43 out of 117, or 36.75%). These categories are illustrated and commented on in the subsections below. The "other" category is not illustrated, as it contains comments that do not belong to any TPACK category, and are mainly comments related to the COVID-19 pandemic or to net-based language learning in general, as well as those who simply state that they have no other comments (a total of 17, or 39.53% of these 43 answers). All examples are as written by the informants, with spelling and grammatical mistakes preserved.

**Table 3. Categories of TPACK knowledge in the free-text comments**

| TPACK category | Frequency |
|---|---|
| Technological knowledge | 3 |
| Pedagogical knowledge | 8 |
| Technological pedagogical knowledge | 12 |
| Technological pedagogical content knowledge | 3 |
| Other | 17 |

### Technological Knowledge

The first set of comments relate to Zoom as a tool in itself, without referring to its use in teaching:

*Unlike Connect Zoom works very well. It is very easy to use . I don't think I need addititional training as I understand it.*

There is a comparison made with Adobe Connect, since this is the tool used in the university before Zoom. The comments are more positive toward Zoom. However, most comments link Zoom with pedagogical issues, which we specifically take up in the section after the next.

### Pedagogical Knowledge

Pedagogical limitations are a more frequent theme that can be identified. These comments relate not to the technology itself, but rather to the pedagogical set-up of courses and, specifically, the possibility for interaction:

*It's not Zoom that is the problem but how the lessons are set up or the participants.*
*From my experience, the fact that my studies have been/are net-based is not the defining factor for failure or success. Much like in person studies or campus studies, it depends on motivation, teachers, classmates, learning climate, material and so on.*
*The everyday "random meeting" in the library or after class is missing in the online forum. I think it reallly emphasises the value and importance of some sort of study group.*

These comments indicate an issue that is relevant for net-based language learning in general, namely, that it is not the mode per se that is indicative of success or failure of learning, but rather the pedagogy chosen by the teacher.

### Technological Pedagogical Knowledge

As mentioned, Zoom is mostly commented on in relation to the pedagogical set-up of the courses. There are good features in the platform that will help learning, as indicated in the next comment:

*I think Zoom has all the tools to recreate a physical classrom for the most part, unlike other apps/tools.*

Similarly, we see the following comment:

*Not all teachers know how to use all the functions in Zoom, so sometimes you get a very basic level seminar because they do not really understand how to interract with the students through zoom.*

There is a fundamental need, according to my informants, for teachers to learn how to teach in net-based environments.

Zoom in general is described as a good tool for communication and language learning, especially because of features like the chat mode and breakout rooms where small-group discussions can take place:

*According to me, Zoom is more functional than other online conferencing platforms or LMS because it's really easy to work in groups via breakout rooms or participate in during the seminar (raise hand function, chat...etc.). The share screen function is also really useful to follow the lesson and take notes.*

A particular feature of Zoom, breakout rooms, aids small-group work.

Some major hinderances are identified for language learning in net-based environments in general, though:

*I think it is too difficult when a person try to learn a new laguage on net-based. Learning a new laguage needs to practice to listen and speak but it is nearly impossible on net- based education.*

This can also be caused by the distance inherent in the digital environment. Teachers need to work more to encourage oral interaction in classes:

*During seminars, at least in my group, very few talk. Even though I myself think that it is easier online, it seems as the barrier is still high for many to say anything, which results in us missing out on valuable exchange. Honestly, people even might not be there mentally either. It's easy to zone out.*

This clearly supports the result presented previously for interaction, where there was reported to be much less student-student interaction. This is an important conclusion that needs to be discussed more in teacher training at all levels, I propose. Teachers need to develop competence in how to promote interaction through all available modes:

*Lectures CAN be more interactive, with the chat I think it's easier to ask questions. Also, since you actually don't meet the co-students, and possibly never will, I feel less embarrassed when talking. Even though I know I make several mistake it is not as bad as losing your face when sitting in the same room.*

Text chat, though, is seen as a positive affordance for encouraging interaction:

*The ability to ask questions in the chat is quite good and definitely helps with online seminars.*

Text chat is described as a vital feature of video-conference environments in general, as it makes it easier to ask questions if students find interaction difficult (cf. Tan et al., 2016). Similarly, when there are problems with the oral mode, text chat allows interaction to still take place.

Something of a problem that is mentioned is that there is a lack of social interaction within learning communities, since at the university in question there are rarely any social sessions for students, in the sense that all digital meetings take the form of lectures or seminars:

*The university's platform does not provide a space for students to interact, so communication is very difficult part of the courses. I feel alone if I have any questions because nobody checks the forum, which is akin to emails - people don't check or respond to them often.*

*The difficulty with online education is the social part. You don't get the same connection with other students as you would when meeting face to face. I think this affects the participation during seminars as people are "afraid" to speak due to the fact that we don't know each other.*

This clearly relates to the need for a learner community and interaction for language learning (cf. Vygotsky, 1978). Informally, the author knows that certain student groups set up private Facebook or WhatsApp groups for communication outside of the classroom, but this is done on their own initiative.

A set of comments relate to how to interact in online environments in general, that is, netiquette, which is not a given skill:

*Not training, but more a routine for how we work with these seminars. Do we use "reactions" and "raise hand" before we speak?In a classroom I think that teachers would be more demanding with raising hands and so on, but in Zoom it is more up to the students themselves to just talk without considering raised hands etc.*

Both teachers and students appear to need training in how to work and interact online.

### Technological Pedagogical Content Knowledge

There are few comments that actually relate to all three types of knowledge, but an example is:

*I think Zoom is just a tool to gather people and organize some discussions / group work. But I think some other sources / materials need to be used as well. Maybe exercises in a questionnaire form (like google forms), so that a teacher can see results of all students and focus on those points that cause difficulties, rather than asking people in Zoom. I think many feel awkward there because we do not know each other, we do not really see each other during the class, but then one has to talk in front of the mostly unfamiliar audience. Maybe groups in breakout rooms should have more students... Otherwise, net-based learning feels "too distant". I guess there is no way to make it like a real life interaction, but at least we can approximate this.*

This comment relates the content to the pedagogical and technological affordances, and also to the pedagogical set-up of courses. It is clearly an important mission for teachers to make an encouraging environment for interaction, and this is a vital technological-pedagogical competence how to do so.

To summarize, we see the main category of comment is technological pedagogical knowledge. Finally, we now comment on these themes in relation to the background.

## DISCUSSION

Looking at the text comments from the informants overall, we see a lot of overlap with what has been taken up in the research on TPACK and net-based language learning. For example, the development of community (cf. Decker & Beltran, 2016) is a fundamental need when it comes to learning language, and so it is vital for instructors to create the conditions for such learner communities in their courses. This can be promoted through the different modalities available in Zoom, the students mention, as we also have seen in Tan et al. (2016), Satar (2020), and Serhan (2020). Many informants refer to the problems with interaction, and how it is a strong affordance of videoconferencing environments like Zoom to have the text chat function. This enables interaction to

take place alongside oral communication and encourages the development of a community, despite any technological or interactional difficulties.

Interaction between learners is seen as possibly the most challenging for online instructors, and this is supported by the informants here. Many comments refer to problems with creating study groups and how important they are for language learning. This, therefore, is clearly a vital skill for instructors to develop, namely, the development and encouraging of learner interaction. Recall that in the community of inquiry framework (Garrison et al., 2000, 2001, 2010), teacher and student presence is mentioned as one of the important factors in learning (cf. also Semingson et al., 2018, p. 5), as are the design of a course and the management of interaction. Thus, the teacher plays a vital role in encouraging interaction between learners, among others.

As has been identified over many years at all stages of the development of net-based language learning, the interference of technology in interaction is something that needs to be accounted for by instructors, and measures to deal with any such problems need to be planned for (Tan et al., 2016; White, 2020). This planning for interaction in general is a vital part of instructors' pedagogical technological competence (Wigham & Satar, 2021), which we identify as the most common category of comment in the data set. So, this is the main conclusion we draw, namely, that instructors' digital competence and ability to apply technology in the pedagogical environment need to be addressed. There are clearly many situations where, according to the students, instructors are unaware of features of the Zoom platform that would aid in interaction.

Thus, an issue for universities is how to train such technological pedagogical competence. Instructors' attitudes to technology are very much an issue, as many might feel stress from having to consider many different modalities and functions in the environment (Peper et al., 2021; Raygan & Moradkhani, 2022). Pedagogical support is vital as researchers have pointed out (e.g., Mishra, 2019), since both instructors and students can experience difficulties for different reasons (cf. also Nafisatul Mu'awaneh et al., 2021). Something implemented at the university that is the focus of this case study is the need for support in the different net-based platforms that should be available into the evening as well as during the day. There are a number of net-based language courses that have real-time classes after standard working hours (i.e., 9-5), and so the possibility of support outside these times offers a very important and well-appreciated service to all concerned.

Regarding the TPACK framework itself, we can see that technology is not separated from pedagogy, and so it suggests that they should not overlap, but rather technology should be part of pedagogy. Saubern et al. (2020) argued for a similar reimagination of the link between pedagogy and content, and so what we would propose is a specific version of the model illustrated in Figure 2.

There is such a fundamental connection between technology and content, on the one hand, and pedagogy, on the other, that we propose putting the former wholly within the latter. Of course, there is specific technology and content knowledge that we have outside the pedagogical context, but in the context of net-based language learning there is a fundamental link in this situation and, in this specific context, Figure 2 is a valid representation of teachers' TPACK. It should be noted that, in line with Mishra's (2019) work, what is shown in Figure 2 is also embedded within the context of the university, distance education norms, or the specific distance setup.

## CONCLUSIONS

This study focused on students' attitudes to language learning through Zoom and, in addition, to the TPACK framework and how it can be used to represent the competencies instructors need in net-based language teaching. It is found that specifically the intersection between technological knowledge and pedagogical knowledge is seen to be lacking, in that instructors are felt not to be aware of features of the Zoom environment that can then be applied in the language learning classroom. This leads to a reconception of the TPACK framework, where technological knowledge and content knowledge are seen as entirely subsumed under pedagogical knowledge. What this entails is that

**Figure 2. Proposed conception of the TPACK framework**
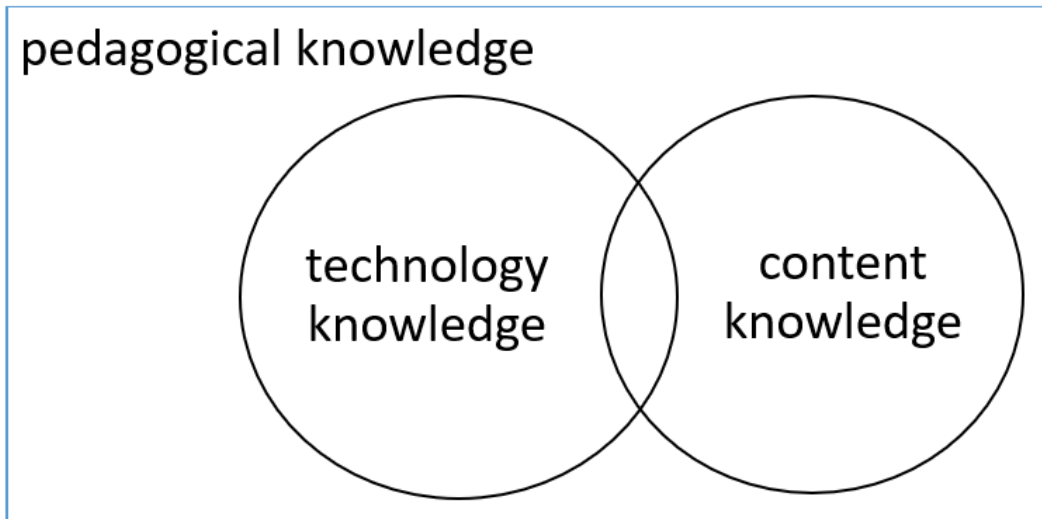


in the context of net-based language learning, technological knowledge and content knowledge are relevant *in relation to* their pedagogical instantiation in the classroom.

It is specifically this fundamental link between technological and pedagogical types of knowledge that is mentioned as a particular problem by the informants, which entails that our hypothesis is supported. Thus, an important conclusion from this study is that such knowledge needs to be developed and reinforced through professional development for instructors. It is an area that students identify as vital for an effective and positive learning experience.

Even though this was a relatively small sample, and not evenly distributed between levels and courses and genders, it provides good results that are important for understanding teacher competencies. There are no obvious outlying opinions in the data, and so it suggests that the attitudes described are relevant cross-level with the English subject at the university in question. Humanities subjects are notoriously biased toward female students, and so a similar study among more male-biased areas like engineering or technology would be appropriate in order to gain a more balanced perspective.

In terms of other future research in this area, naturally teacher and student interviews would allow for the development of points made in the questionnaire data. This would also allow the teachers' voices to be heard, to specifically discuss the reasons for particular pedagogical choices. Are they done for specific pedagogical reasons, or are they the result of a lack of knowledge about either technology or pedagogy on the part of the teacher?

With this said, this study brings to light the importance of technological pedagogical knowledge and that both teachers and administrators ought to make this type of professional development a vital part of teacher training.

## DECLARATION OF INTEREST

I declare that there are no conflicts of interest in this study.

## PROCESSING DATES

08, 2024

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## APPENDIX: QUESTIONNAIRE

What is your gender? *
Male
Female
Nonbinary
Prefer not to say

What is your age? *
18-30
31-45
46-60
61+
Do not want to reveal

What is your overall experience of net-based language learning? *
Excellent
Good
Neutral
Poor
Very poor

What is your experience of net-based language learning for developing speaking skills?*
Extremely positive
Generally positive
Neutral
Generally negative
Extremely negative

What is your experience of net-based language learning for developing listening skills?*

What is your experience of net-based language learning for developing academic writing skills?*

What is your experience of net-based language learning for encouraging interaction with other students? *

What is your experience of net-based language learning for encouraging interaction with teachers? *

What is your experience of net-based language learning for grammar development? *

Do you feel that the teaching materials have been adapted specially for net-based language learning? *
Yes
No
Unsure

Do you feel you have been able to form a learner community on your courses? *
Yes
No

Do you have any other comments on net-based language learning in general? *

How many terms have you had experience of using Zoom for language learning? *

What languages have you studied using Zoom for seminars? *

Have you had any training in using net-based technologies like Zoom for online seminars? *

What additional training would you like in using net-based technologies like Zoom? *

What is your experience of Zoom for developing speaking skills? *
Extremely positive
Generally positive
Neutral
Generally negative
Extremely negative

What is your experience of Zoom in terms of developing listening skills? *

What is your experience of Zoom in terms of developing academic writing skills? *

What is your experience of Zoom in terms of encouraging interaction with other students? *

What is your experience of Zoom in terms of encouraging interaction with teachers? *

If you have had seminars using a different tool from Zoom, how does Zoom compare? *

What do you see are the positive sides of Zoom? *

What do you see are the negative sides of Zoom? *

Do you have any other comments on language learning through Zoom? *

Are there any final comments you would like to add? *

*Jonathan White is an Associate Professor in English Linguistics at Högskolan Dalarna in Sweden. His research focuses mainly on computer-mediated communication and how this intersects with online language learning. Also the effect of online communication on the English language in terms of norms and grammar are important areas of interest.*