Creation of a first matrix: French matrix

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The review of digital skills contributing to digital competence is the starting point of the developing of the matrix. The review done shows the gap into the self-assessment process for teachers, as their self-reflection on their practices is mainly based on tangible criteria. The absence of these elements makes self-diagnosis complex.

Self-assessment

The university teachers often exhibit a strong allegiance to their disciplinary reference and scientific training, which results in a lesser interest in the complex role of teacher-researcher or teaching in general. This dual professional profile of a researcher-expert in both research and university teaching, as it exists in everyday reality, is marked by a significant imbalance, with a strong preference (or aspiration) for the research component. This duality can lead to difficulties in developing harmonious professional skills. To facilitate this development, the first challenge for the professional development of university teachers is to promote a convergence between the research and teaching components, rather than their competition.

Starting point

The in-depth analysis of the framework of our study made it possible to highlight the hasty adoption of videoconferencing tools, raising the major challenge for teachers of mastering the associated skills. Current practices are based on the presumption of a certain level of digital literacy among teaching staff, but the number of skills frameworks flourishing in this area suggest a need for training, particularly for optimal use of videoconferencing in EAD and hybrid. Indeed, the self-taught use of a tool does not guarantee mastery of the skills necessary for its optimal use, unlike structured training. However, to trigger a need for training, it is essential for teachers to be able to take stock of their practices by positioning themselves with regard to the expectations of the reference framework. The bibliographic synthesis carried out demonstrated to us the theoretical aspect of the current institutional framework and its lack of concrete applications for staff.

Following this observation, means must be considered to operationalize these general benchmarks for trainers. The development of a skills matrix specific to videoconferencing seems relevant to allow a better understanding of the expected skill levels. We can then ask ourselves how such a matrix can engage teachers in a process of professional development.Face à cette question, plusieurs hypothèses peuvent être avancées.

Methodology

The development of the skills self-assessment matrix for the use of videoconferencing tools is part of a co-construction approach, aiming to actively engage higher education teacher-researchers in the creation of a tool taking into account their specific needs in the most comprehensive way possible. This collaborative approach ensures its relevance and usefulness, particularly as a gateway to professional development. The individuals concerned by this study and interviewed are therefore higher education teachers using videoconferencing in an educational context. For better representation, all types of positions and levels of experience are considered.The approach is divided into four main stages, with the possibility of evolving the tool based on feedback from experts. The development and validation of the matrix could then take the form of an iterative process to enrich and refine it.

Survey

The same questionnaire is distributed by all participants of the EdViCon project to students and teachers of higher education in their country, in order to maintain consistency in the final use of the results. It is submitted to participants through a Google form, a tool selected for its ease of dissemination and processing of the data collected, although it is not an institutional tool. The French translation, carried out by us to facilitate the understanding of the questions, strives to be as faithful as possible to preserve the meaning of the questions asked. Structured in three main sections, it evaluates the personal profiles of respondents as well as their technical and teaching skills in a videoconference classroom context. In this way, it is possible to develop the technical and educational components of the TPACK repository, the content component not being relevant to develop given the varied specialty areas of the teacher-researchers. Technical and pedagogical skills are explored using a Likert scale where teachers are asked to rate from 1 to 5 their agreement with a statement such as: “I am competent to…”, to obtain nuanced results. The exploration aims for completeness in order to be able to identify the essential skills for the design of the matrix.

Statistical analysis

Firstly, a descriptive statistical analysis is carried out in order to identify the skills considered most important by the panel. The data then requires a multidimensional exploratory statistical analysis using principal component analysis which makes it possible to identify correlations between the different items. Thus, blocks of skills can be identified for the development of the matrix. The RStudio software is used for this statistical exploration. In order to ensure their quality, it is also necessary to carry out a statistical analysis of the measurement tool. According to Touzani and Salaani (2000), “psychometric scales must first meet certain criteria: their use must be done in such a way as to minimize errors to maximize their reliability and validity”. This statement differentiates reliability from validity, which are statistically validated using different tests. The different available methods set out by Touzani and Salani (2000) make it possible to select the statistical tools most suited to the experimental protocol applied. As part of our exploratory study carried out using Likert scales on a small sample of individuals, it seems relevant to select Cronbach's alpha to measure the reliability of our questionnaire. Indeed, it applies to small sample sizes and can be carried out after a PCA.

The validity of the measurement tool is initially verified using the content validity which is obtained using the English version of the questionnaire. It was submitted to researchers from the EdViCon consortium and validated by these experts. However, the distribution of the version translated into French was hampered by language barriers. To obtain convergent construct validity, it must also pass a convergent validity test using the questionnaire in the English version as a reference tool in order to ensure that the two versions measure the same concept.

Criterion and construct validities cannot be applied because they require another validated model measuring the same data, or require a pre-existing theory that guides the creation of the questionnaire. However, in the context of an exploratory study, such a concept can only be identified after analysis.

Matrix creation

The skills perceived as essential obtained through the questionnaire make it possible to adapt the framework to the practice of videoconferencing because “the skills, conceived as complex know-how, are few in number in a framework at the basis of professionalization” (Late, 2017). Furthermore, it seems relevant to divide the progression into three levels, the first level corresponding to a young graduate and the last to an experienced professional. Thus the matrix can prove useful for a possible refresher course for current staff but also for new teachers. By synthesizing these elements, we obtain a draft matrix based on the following principle:

	Domaine 1 (D1)		
	Compétence 1 (C1)	Compétence 2 (C2)	Compétence 3 (C3)
Niveau 1 (N1)	• Attendu 1 D1C1N1 • Attendu 2 D1C1N1 • …	• Attendu 1 D1C2N1 • Attendu 2 D1C2N1 • …	• Attendu 1 D1C3N1 • Attendu 2 D1C3N1 • …
Niveau 2 (N2)	• Attendu 1 D1C1N2 • Attendu 2 D1C1N2 • …	• Attendu 1 D1C2N2 • Attendu 2 D1C2N2 • …	• Attendu 1 D1C3N2 • Attendu 2 D1C3N2 • …
Niveau 3 (N3)	• Attendu 1 D1C1N3 • Attendu 2 D1C1N3 • …	• Attendu 1 D1C2N3 • Attendu 2 D1C2N3 • …	• Attendu 1 D1C3N3 • Attendu 2 D1C3N3 • …

Validation

In order to validate and modify the skills matrix, a qualitative field analysis is necessary to complement the results obtained during the quantitative study. Our choice fell on semi-structured interviews because, as Imbert (2010) indicates, “the objective is to grasp the meaning of a complex phenomenon as it is perceived by the participants and the researcher in a dynamics of co-construction of meaning”, which corresponds perfectly to the iterative process developed for this study. Thus, it is possible to collect a broader spectrum of information complementary to the standardized data produced by the questionnaire administered in the first part.

Participants

Experts from the technical and educational fields are also consulted in order to provide a more in-depth analysis of the skills in the matrix and to propose possible elements that would not have been taken into consideration when developing the survey questionnaire. An interview took place in the presence of a person in training at the time, she chose to only intervene at the end of the interview so as not to disrupt the smooth running of it.

Interview guide

These interviews meet a triple objective: to validate the structure of the matrix, to evaluate its impact as a self-evaluation tool and to glean information for its implementation. The interview guide was tested with two people outside the research team, prior to conducting the interviews, to ensure the clarity of the questions as well as the relevance of the possible answers with regard to our research question.

Data collection and analysis

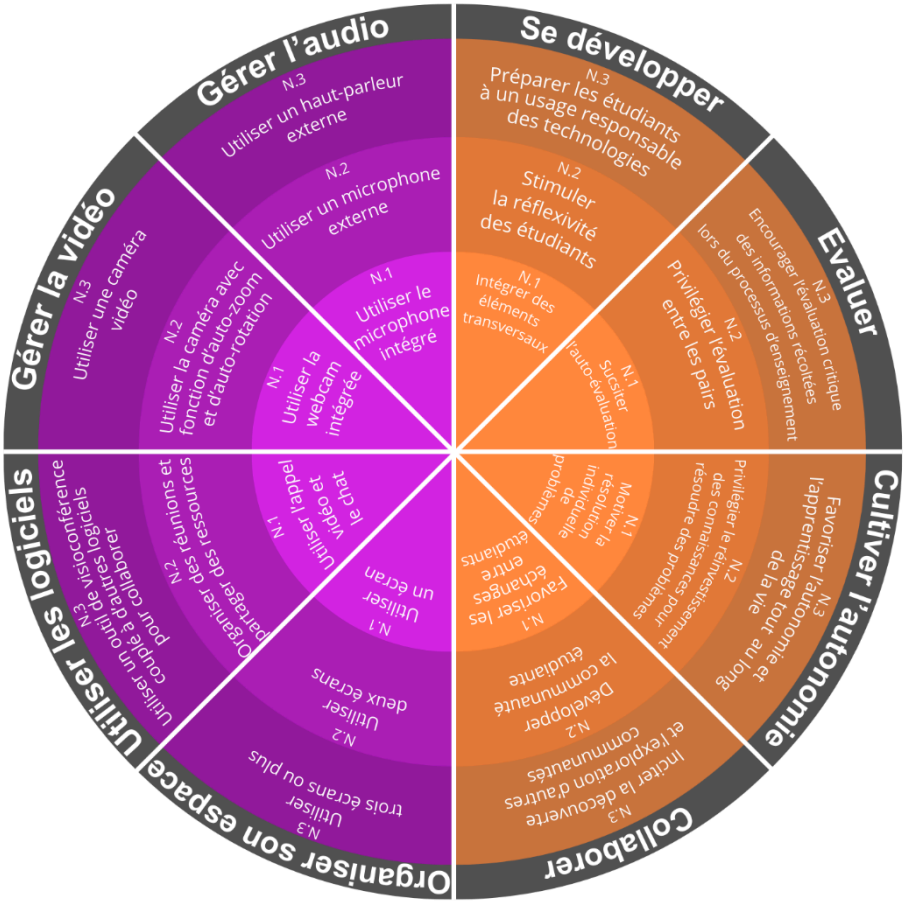
Interviews take place in person and by videoconference depending on everyone's possibilities. They took place, on average, over a duration of 1 hour 05 minutes and were mainly held by videoconference in the participants' working environment. To prepare them for analysis, a first transcription is carried out using artificial intelligence followed by a rereading coupled with viewing of the interview to correct errors and observe if any elements of non-verbal communication appear. relevant to note.

MATRIX v.1

Thanks to the survey carried out among teachers, it was possible to identify a base of skills as well as more advanced level skills. The item concerning the skill of using “other” tools was discarded due to the multiplicity of tools that it could encompass, leading to ambiguity in the interpretation of the responses.

BASIC COMPETENCES	**ADVANCED COMPETENCES**
Using a video conference camera with auto-zoom and auto-rotate function	Use of video camera
Using the microphone	Using external speaker
Mastery of Skype features	Using an extended screen
Mastery of Google Hangout features	Mastery of Google Meet features
I allow students to collect/process the results at the end to use them as data for subsequent activities based on student community participation.	I strive to enable students to improve their achievement by consciously developing their ability to consider ideas.
I let students evaluate the information obtained from other teachers and students.	I allow students to solve problems on their own.
I allow students to analyze patterns occurring during the teaching and learning process.	I prepare students to be responsible individuals in a technologically advanced society.
	I promote autonomy and lifelong learning.
	I encourage students to use their prior knowledge to solve new problems.
	I integrate the fundamental principles of all subjects.
	I encourage students to learn through exploration and discovery.

In the modeling of our matrix we keep the dichotomy between technical skills and educational skills, in order to allow a better reading of it by the public concerned. Indeed, we have noted the disparity in level between the two fields and it seems more judicious to highlight it to trigger a reflective process among the public concerned. We also note that certain items can be grouped together in the same skill and therefore constitute several levels of expectations. The expectations of the “use software” skill are drawn from the specific characteristics of each tool. This approach makes it possible to obtain a first version of the matrix:

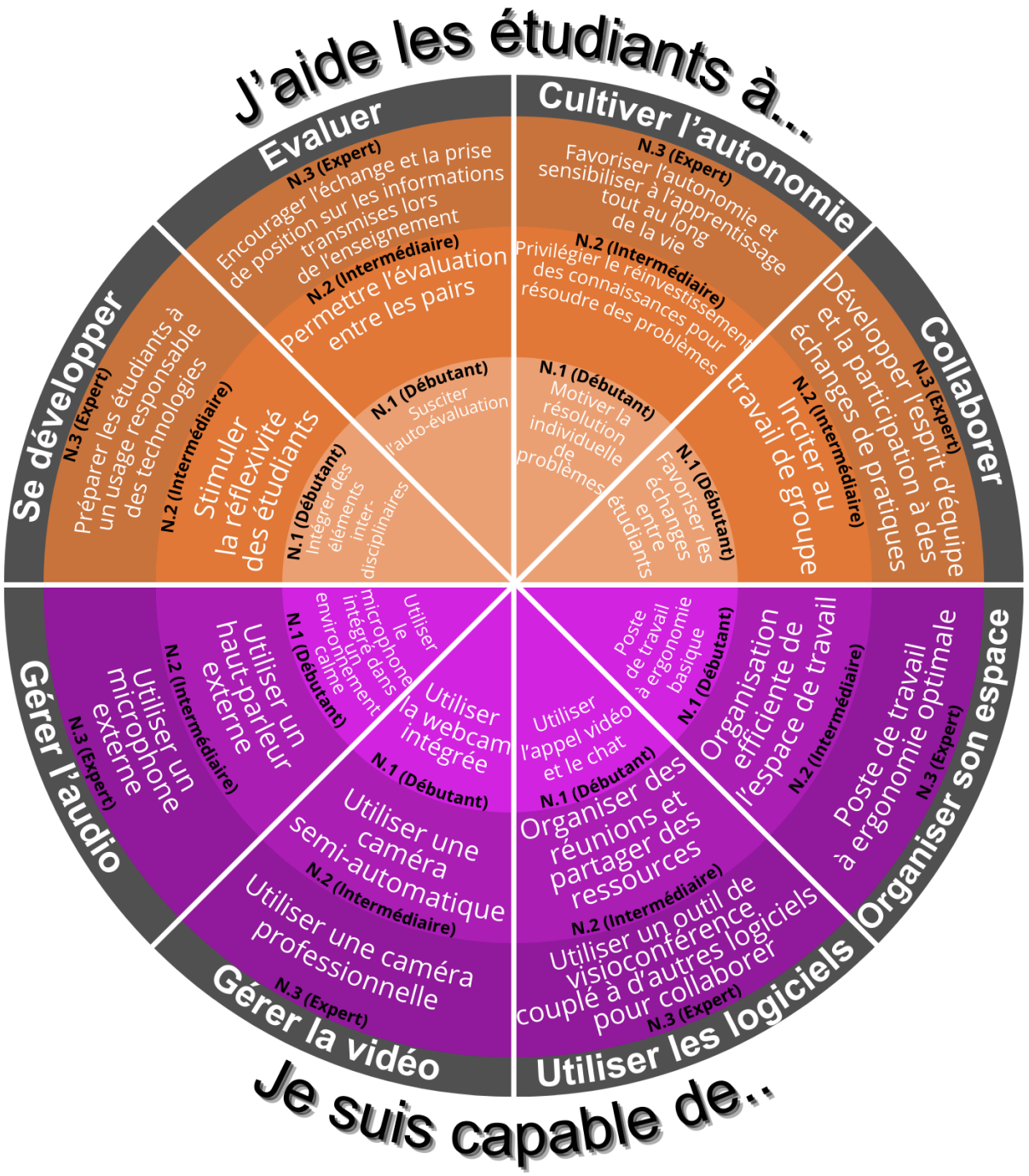


Validation

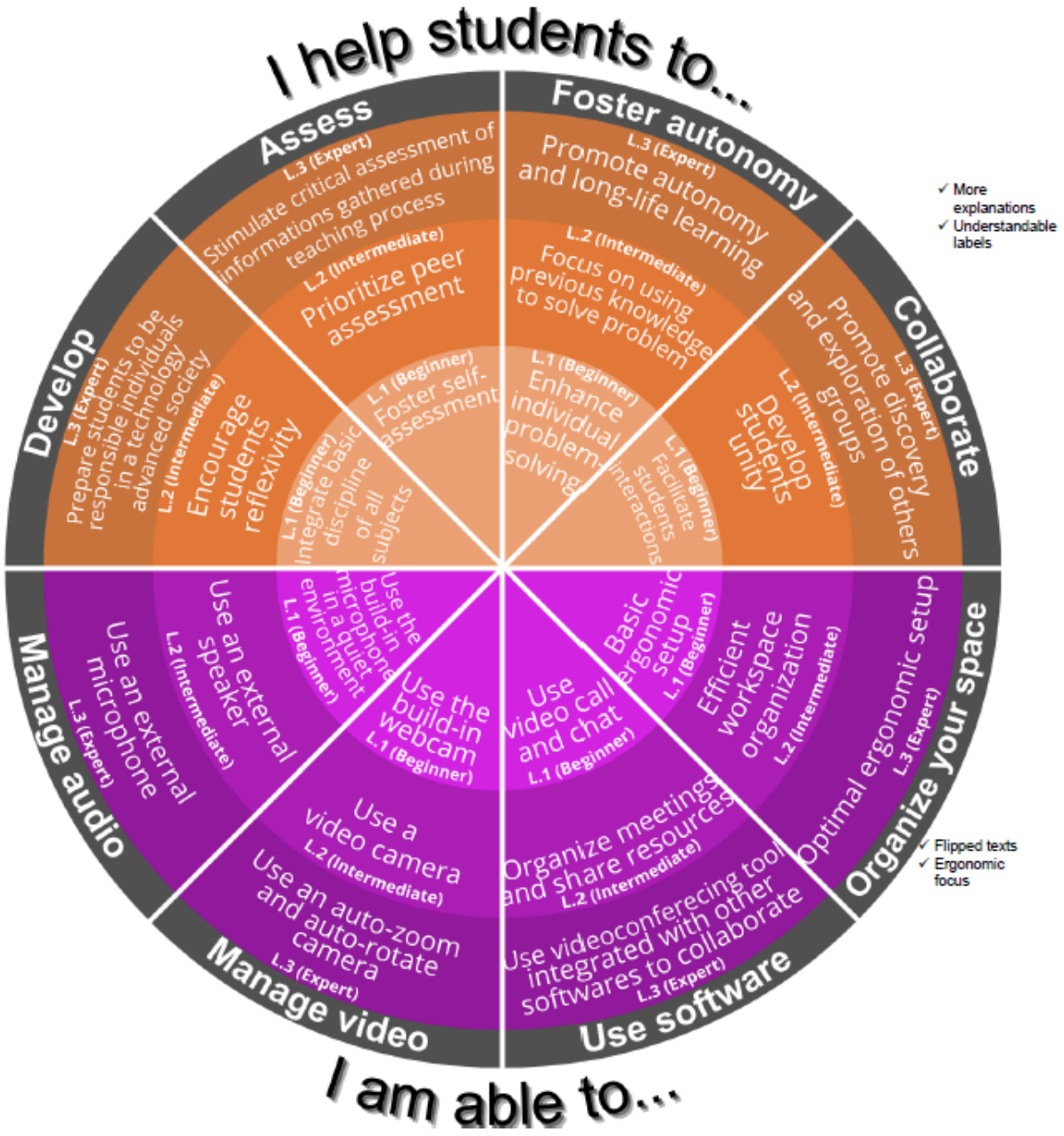
Matrix competence

Thanks to the valuable recommendations made by our panel, a second version of the matrix was able to be developed. The result is a tool that is more ergonomic and understandable by the teaching staff. However, certain suggestions could not be implemented, such as adding a third area of expertise, in order to avoid undesired complexity of the model.

French version



English version



User test

User test adapted from the methodology of Yennek et al. (2015), making it possible to measure user satisfaction with the tool using Likert scales and according to the following framework

Code	N° item	Question
UP1	1	This tool will positively influence my desire to train in videoconferencing education.
DP1	2	I found this tool difficult to use.
FOR1	3	I found the resources provided relevant.
UP2	4	This tool has practical value for my work.
DP2	5	I had difficulty understanding the questions asked.
FOR2	6	I appreciated the scripting of the tool.
UP3	7	This tool will allow me to improve my professional skills.
DP3	8	Using this tool took a lot of effort.
INT1	9	If I need training to develop my professional skills, I intend to use this tool again if possible.
INT2	10	I plan to use other self-positioning tools whenever possible.
INT3	11	I prefer to use this tool if I need to assess my level of skills in relation to my professional activity.
INT4	12	I plan to recommend this tool to other people.
OUV1	13	Do you have any additional comments to make?

Coding:

Satisfaction :

- Perceived Usefulness (PU) dimension: items 1, 4, 7

- Perceived difficulty (PD) dimension: items 2, 5, 8

- Training content dimension (FOR): items 3, 6

Intentionality to reuse the tool (INT): items 9, 10, 11, 12

Closing open question (OPEN): item 13