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ARTICLE

# Training teachers in digital competencies for formative assessment through collaborative e-rubrics

## Formación de docentes en competencias digitales para la evaluación formativa mediante e-rúbricas colaborativas

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**Abstract**: This study is based on the premise that the teaching profession is one of the professions with the greatest responsibility for educating citizens in digital competence, and as such we should focus on how to train these professionals. We carried out this research during an in-service teacher training programme in Ecuador and based it on the principle that we should train teachers in the same way as we expect them to teach their students. During the training programme, teachers acquire formative assessment skills using digital e-rubrics (teacher and peer assessment) and work in collaboration with other teams of teachers. We analysed the results of applying the same digital rubric to an oral competence exercise involving participating and course teachers, and conducted a correlational research design, obtaining a Cronbach's alpha of 0.953 from the 508 evaluations carried out with the same e-rubric. Based on the results, we present a digital rubric that has been validated to assess the oral presentation of educational projects. Moreover, we analysed the difficulties teachers had when using the rubric, as shown in the assessment of the quality of the resources. Examples of other practices and contexts for training teachers in digital rubric methods are also presented. Finally, we provide a set of web-based rubric tools as possible applications.

**Keywords**: In-service teacher training, Digital competencies, Formative assessment, Digital rubric, Collaborative work.

**Resumen**: El presente estudio parte de la premisa de que el profesorado es una de las profesiones en las que más recae la responsabilidad de la formación de la ciudadanía en competencia digital; por lo tanto, deberíamos centrar nuestra atención en cómo formar a este colectivo profesional. Siguiendo el refrán conocido de formar a los docentes como esperamos que ellos enseñen a sus estudiantes, la investigación se sitúa en un programa de formación permanente de docentes en Ecuador, donde se forma en la competencia de evaluación formativa mediante erúbricas digitales (evaluación profesor y pares) y en colaboración en equipos de docentes. Se analizan los resultados de la aplicación de la misma rúbrica digital entre los docentes participantes y el profesorado del curso a un ejercicio de competencia oral, y se realiza un diseño de investigación correlacional, obteniendo un Alfa de Cronbach 0,953 desde las 508 evaluaciones realizadas con la misma e-rúbrica. Como resultados presentamos una rúbrica digital validada para evaluar la presentación oral de proyectos educativos; a su vez, analizamos las dificultades en su aplicación entre docentes, como pudo comprobarse en la evaluación de la calidad de los recursos. Al tiempo que se presentan ejemplificaciones para otras prácticas y contextos de formación de docentes en metodologías de rúbricas digitales. Por último, se ofrece un conjunto de herramientas de rúbricas en internet como posibles aplicaciones.

**Palabras clave**: Formación permanente del profesorado, Competencias digitales, Evaluación formativa, Rúbrica digital, Trabajo en colaboración.

## 1. Introduction

Given the rapid and significant changes in society, teaching is one of the professions that requires constant updating. With this in mind, guidelines have been drawn up for the competences that teachers need to master. These are set out in guides and "reference frameworks" to be used by those of us working in initial and in-service training (Eurydice, 2019). The 'Marco de Referencia de la Competencia Digital Docente es una guía de referencia para el diagnóstico y la mejora de las competencias digitales del profesorado' (English: Digital Competence Framework for Teachers' is a reference guide for diagnosing and improving teachers' digital competences) INTEF (2023), contains five areas of competence and 21 competences, structured into six levels of competence. In this paper we will focus on three of them, namely Area 2. Communication and Collaboration, Area 3. Digital Content Creation, and Area 5. Problem Solving. We have chosen these areas for a number of reasons. Firstly, because of the speed at which digital transformation is taking place in all areas of society and work, forcing us to rethink the digital content we produce and use in education, and secondly, because of the need to address issues collectively as a team. As Hargreaves & O'Connor (2020) point out, collaboration is inextricably linked to teaching and supports the professional development of teachers. Unfortunately, the recent pandemic has meant we have had to collaborate using technological networks to deal with this situation. As a result of this collaboration, we have been able to better withstand isolation, despite the limitations experienced due to the lack of traditional forms of family-student-teacher relationships (Hargreaves & Fullan, 2020; Jordan et al., 2021). Finally, and following on from the above, given the complexity and diversity of the nature of the problems we face today, problem solving requires collaborative work, which requires expertise when working in virtual professional communities (Seashore, 2006; Gómez López & Silas Casillas, 2016; Devlin et al., 2019).

Since teachers are directly involved in the digital empowerment of the public, it is clear that we need to address the initial and in-service training of teachers in this skill. In this regard, some interesting studies based on these guidelines place this within the broader framework of the Ibero-American space (Martín-Cuadrado et al., 2022; Pérez-Sánchez et al., 2022), including the 'Capacitación de Formadores en Competencias Digitales en América Latina y Caribe' (ALC) (English: Training of Trainers in Digital Competences in Latin America and the Caribbean) within the 2030 Agenda, which has developed 172 intervention projects for the training of trainers in digital competences. The work involves an important group of leading Ibero-American academics and researchers in each of the five competence areas.

In addition to providing digital competence training, such as the ones described above, we need to develop more effective teacher training models. These need to be in line with the formats currently found in everyday life and social networks (Marcelo & Marcelo, 2021) and allow teachers to work collaboratively to address problems and carry out improvement projects in their classrooms. Networks and videoconferencing have helped us deal with the pandemic, and as a result teachers have experience of using formats such as videoconferencing and platforms that allow them to work collaboratively. However, there are still issues to be addressed in the use of these technologies, such as respecting diversity, finding solutions to intercultural problems and creating digital resources to support day-to-day teaching. As Paredes-Labra et al. (2015) point out, we should consider initial and ongoing teacher training in the use of

technology as a process of transforming teaching, and focus on topics relevant to their analysis and transformation, as well as considering the school a community where teachers work together (p.101). We believe this is the best way to face challenges, and that the pandemic has shown this to be the case.

One of the most outstanding results of the collaboration during the COVID-19 pandemic was the joint resources for learning assessment created by teachers. Criteria were agreed upon to address the competence areas previously mentioned (Areas 2, 3 and 5). Moreover, educational improvement projects promoting change were shared in order to promote the transformation mentioned above, and problems in the teaching context were addressed. These projects were shared and quality criteria were applied collectively through professional networks. In addition, the technologies were addressed through shared reflection and cooperation among all the agents of the educational community (Bolívar, 2018; Peirats et al, 2015). We include here the drafting of collaborative intervention projects designed to improve the practical aspects. These were open to peer evaluation and had a shared understanding of quality criteria.

For this shared endeavour, teachers need training in digital competences within teaching teams. They need objective assessment methods that allow for formative assessment, such as those that can be created using digital rubrics and related resources (Rodríguez Gallego, 2012; Velasco-Martínez & Hurtado, 2018; Raposo-Rivas & Cebrián-de-la-Serna, 2019; Suh, 2021; Pérez-Torregrosa et al, 2022), while at the same time considering the need to review assessments in order to align them with the learning objectives (Tractenberg, 2021). What is needed, therefore, is a training programme based on a model of shared collaboration and discussion around the quality criteria of the rubrics, where teachers work together to assess educational projects, in line with the aim of teaching teachers the way they would like them to teach their students. The idea is that teachers should become more collaborative in their practices, even more so in this post-pandemic era, where we should not go back to how it was before, but take advantage of this situation (Hargreaves & Fullan, 2020) in order to continue collaborating through professional networks and bring about a change in our practice using the technological tools we are familiar with and highlighting the importance of evaluation as a tool for learning (Turra et al., 2022).

Education centres usually have institutional platforms that host digital rubric tools. Teachers have been making increasing use of these tools, and this calls for a review of the possibilities they offer and the way they should be designed (Dawson, 2017), as well as the behaviour of students when using them to evaluate their peers as recommended in the study by Deniz & Aksu (2021). In any event, rubrics are generally considered to be effective in education according to reviews in the literature, where their scope is usually defined (Jonsson & Svingby, 2007; Cebrián de la Serna & Bergman, 2014; Dickinson & Adams, 2017; Coskett & Jackson 2018; Park et al., 2020), in both summative and formative assessment (Company et al., 2019; Masek et al., 2021). They can be used as an assessment tool for digital portfolios (García-Zabaleta et al., 2020), specific competences, and in different educational contexts, including internships (Cica-Yulia & Muktiarni, 2020), skills and transversal competences (Cubero-Ibáñez & Rodríguez-Gómez, 2018). Indeed, there are digital rubrics for the assessment of oral competences (Pérez-Torregrosa et al., 2022), or other more specific cases such as the use of the CoRubric tool used in this study for the training of pre-service teachers in science (Cebrián-Robles at al., 2021). When teachers wish to develop more sophisticated assessment practices (e.g. peer assessment, sharing the assessment

rubric with other teachers by sharing the competences or indicators to be assessed, etc.) that are not possible on these platforms, they often choose tools other than those provided by the institutions. There are several free platforms on the internet that can be used to create digital rubrics, and, by means of a link to the task module, the external digital rubric can be linked to the institutional platform. These platforms include: QuickRubric (https://www.quickrubric.com/); Rubistar (:https://goo.gl/mmPEZV); Rcampus: (https://www.rcampus.com/); Rubrimaker: (http://rubric-maker.com/); Roobrix: (http://roobrix.com/). When asked which tool to use, we recommend the one that best suits the assessment model and teaching context.

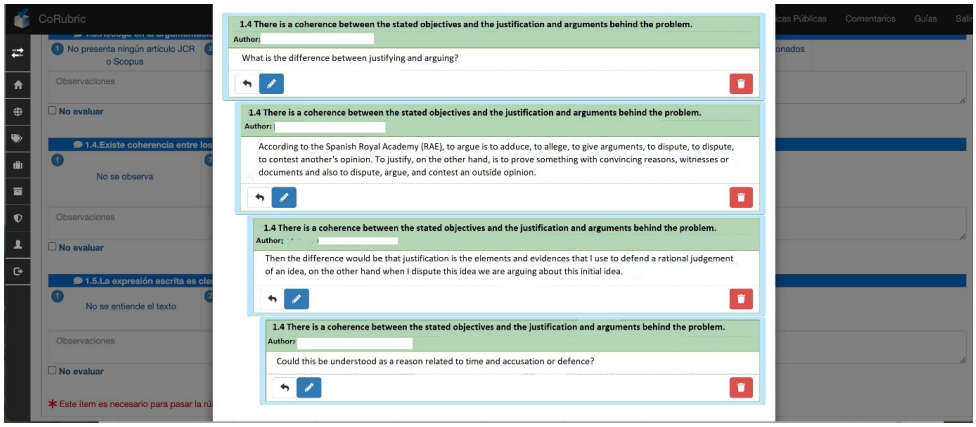


**Figure 1**.Example of the forum for the communicative assessment of the different elements of the rubric using CoRubric.com

In this study, we used the CoRubric tool (https://corubric. com/) because of the characteristics and functions that were created by a group of teachers and researchers as part of an R+D+i project. The tool was developed by comparing, improving and modifying it in different practice contexts and, as in the present study, in other contexts where its impact has been tested and analysed, as shown in Table 1 below. These include formative assessment (assessment of learning in external placements integrated in portfolios, team assessment, 360º assessment of laboratory work, assessment of competences in experimental sciences, argumentation rubrics, assessment of the reflective journals of work placements, etc.) and for all types of formative evaluation (peer evaluation, 360º evaluation, self-evaluation, ipsative evaluation, hetero-evaluation, etc.).

As the prefix of the name CoRubric suggests, it is an ideal platform for collaboration among teachers, as it allows them to agree on the criteria and apply them together. It also has a pop-up that can be used to add clarifications in text format through linked forums that offer an ideal way to analyse all the 23 elements created by the assessment with this rubric. This can be seen in Figure 1 which shows the forum for each of the elements of the communicative assessment, as well as for the competence, the indicator and the level of achievement. As shown in Table 1, we used the CoRubric platform together with other tools for different teaching modalities, tasks and exercises, as well as for different learning outcome purposes. This was based on different experimental research that produced resources and reports of its impact that can be found on the internet.

**Table 1.** References, rubric resources and areas of application of CoRubric.com

| Assessment methods | Tasks | Technologies | Learning outcomes | Research, Resources, References, etc. |
|---|---|---|---|---|
| Hetero-evaluation<br>Eva.Pares | MEDIUM-SIZED GROUP LABORATORIES<br>Dilemmas in professional practices | *LMS<br>*PLE-Portfolios<br>*CoRubric.com<br>* Example rubric<br>https://cutt.ly/UywiViL | Argumentation<br>Information search | Cebrián-Robles et al., (2018) |
| *Ipsative assessment<br>*Peer review | PRACTICUM<br>Work placement journals | *LMS<br>*Google Drive<br>*Trello<br>*CoRubric.com<br>* Example rubric<br>https://cutt.ly/sywi3TL | Analysis<br>Reflection<br>Mastery of terms<br>Applying models, etc. | Cebrián-de-la-Serna (2018) |
| *Hetero-evaluation<br>*Peer review | LARGE GROUP CLASS<br>Video annotations with tags | *Coannotation.com<br>*CoRubric.com | *Applying concepts, models, etc. in real cases | Cebrián-de-la-Serna et al., (2015) |
| *360º Evaluation | LARGE GROUP CLASS<br>Oral presentations of academic projects | *CoRubric.com<br>*Example rubric https://cutt.ly/yt6judU | Communication and digital competences<br>Teamwork | Serrano Angulo & Cebrián de la Serna, (2011). |
| *Peer reviews<br>*Hetero-evaluation | BACHELOR'S DEGREE FINAL PROJECT AND MASTER'S DEGREE FINAL PROJECT<br>Oral presentations | Idem above | Communication and digital competences | Raposo Rivas & Cebrián de la Serna (2019) |

One of the fundamental aims of a rubric is to achieve maximum objectivity, i.e. to remove as much of the evaluator's subjectivity as possible. This can lead to a dispersion problem when teachers assess the same exercise. Even when using the same rubric, different results can be obtained for the same product or exercise. To reduce subjectivity, the criterion must be interpreted in the same way and, above all, applied in the same way to the same or different cases to be assessed. One way to train teachers in digital competencies for formative assessment with technologies is to discuss and jointly carry out an assessment exercise using the same digital rubric for the same set of tasks presented by a different group of task participants. The emphasis is on approaching communicative assessment using the explanations regarding why we use it in a given case with the help of technology, as in the case of the forums in Figure 1, where the participants of a professional learning community are in a different location. At this point, we can propose a hypothesis: the results of applying a rubric to the same exercise and group presenting different projects on the same topic do not correlate with the validation of the instrument or with the achievement of digital competence acquired by the teachers. Therefore, the aim of this research is to determine whether there is consistency or dispersion in all the elements of a rubric when applied to the same exercise by all the teachers taking an in-service course.

## 2. Method

The research design is correlational with an interested sample of teachers divided in two groups (37 and 33 respectively) who carried out 508 peer assessments (208 in group A and 300 in group B), including the assessment by the subject teacher on the same exercise. At the end of the course and as a proof of concept of the training received—where assessment technologies were used over six days—the cohesion of the results was analysed in the application of a rubric and in all its evidences in order to determine the level of concordance and reliability of the assessment method achieved.

The design of the rubric assesses projects presented by teachers on the application of technologies in their classrooms as examples of mastery of digital competences, as part of a training module of the Master's in Educational Technologies at the Universidad Casa Grande (Ecuador) in 2018. The last rubric used in this final exercise, among others used in the course, can be downloaded from the public rubric database of CoRubric.com at: https://acortar.link/kWL8VE. The rubric used has been greatly improved as a result of various experiences and evaluations in Ibero-American contexts, such as the one presented here. In this specific study carried out in Ecuador in September 2018, the Cronbach's alpha reliability coefficient was 0.953. An expert process based on these different experiences was used to validate the rubric presented as a final product during the academic years 2018-2020, which showed a slightly lower Cronbach's alpha reliability of 0.934 from these different Ibero-American contexts (Fernández-Medina et al., 2021).

### *2.1. Data analysis*

After the data collection in September 2018, the confirmatory factor analysis showed that the scale has five factors, as seen in Table 2.This refutes the hypotheses and allows us to conclude that the teachers reached the same commonalities in the training carried out using the formative assessment method, in terms of the meaning of the criteria used in the scale and, most importantly, in the application of the rubric to each case.

**Table 2**. Confirmatory factor analysis: total variance.

| Total variance explained | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Initial eigenvalues | | | Extraction sums of squared loadings | | | Rotation sums of squared loadings | | |
| Component | Total | Variance % | Accumulated % | Total | Variance % | Accumulated % | Total | Variance % | Accumulated % |
| 1 | 11,487 | 52,215 | 52,215 | 11,784 | 52,215 | 52,215 | 4,372 | 19,871 | 19,871 |
| 2 | 2,171 | 9,868 | 62,083 | 2.171 | 9,696 | 62,083 | 4,336 | 19.710 | 39,581 |
| 3 | 1,657 | 7,534 | 69,617 | 1,657 | 7,534 | 69,617 | 3,505 | 15,930 | 55,511 |
| 4 | 1,230 | 5,590 | 75,207 | 1,230 | 5,590 | 75,207 | 3,187 | 14,488 | 69,999 |
| 5 | 1,151 | 5,233 | 80,440 | 1,151 | 5,233 | 80,440 | 2,297 | 10,441 | 80,440 |
| 6 | ,988 | 4,492 | 84,932 | | | | | | |
| 7 | ,901 | 4,096 | 89,028 | | | | | | |
| 8 | ,685 | 3,112 | 92,140 | | | | | | |
| 9 | ,612 | 2,783 | 94,924 | | | | | | |
| 10 | ,519 | 2,358 | 97,282 | | | | | | |
| 11 | ,176 | ,800 | 98,082 | | | | | | |
| 12 | ,166 | ,754 | 98,836 | | | | | | |
| 13 | ,110 | ,501 | 99,337 | | | | | | |
| 14 | 0,59 | ,267 | 99,604 | | | | | | |
| 15 | ,056 | ,254 | 99,858 | | | | | | |
| 16 | ,031 | ,140 | 99,999 | | | | | | |

| Total variance explained | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Initial eigenvalues | | | Extraction sums of squared loadings | | | Rotation sums of squared loadings | | |
| Component | Total | Variance % | Accumulated % | Total | Variance % | Accumulated % | Total | Variance % | Accumulated % |
| 17 | ,000 | ,001 | 100,00 | | | | | | |
| 18 | 1,394E-008 | 6,337E-008 | 100,00 | | | | | | |
| 19 | 1,000E-013 | 1,001E-013 | 100,00 | | | | | | |
| 20 | 1,000E-013 | 1,000E-013 | 100,00 | | | | | | |
| 21 | 1,000E-013 | 1,000E-013 | 100,00 | | | | | | |
| 22 | -1,000E-013 | -1,001E-013 | 100,00 | | | | | | |

Note: Extraction technique: principal component analysis.

When we apply a rotated component matrix, 5 internal cohesion factors are clearly observed, as can be seen in Table 3, where the rotation has converged in 7 iterations.

**Table 3.** Extraction technique: Principal component analysis, rotation method. Varimax with Kaiser normalisation.

| | Component | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1. Sufficient relevant and well-structured content is presented | ,274 | ,418 | ,816 | ,168 | ,181 |
| 1.1. Quantity and relevance of information | ,370 | ,549 | ,507 | ,012 | ,126 |
| 1.1.1. The information is scientifically appropriate and accurate | ,370 | ,549 | ,507 | ,012 | ,126 |
| 1.2. Extent to which the message is structured | ,105 | ,176 | ,871 | ,265 | ,180 |
| 1.2.1. Is able to present a structured message | ,105 | ,176 | ,871 | ,265 | ,180 |
| 2. Is able to confidently present a message to an audience | ,272 | ,715 | ,257 | ,226 | ,518 |

| | Component | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 2.1. Oral expression | -,001 | ,798 | ,219 | ,095 | ,314 |
| 2.1.1. Speaks clearly and with good intonation at all times | -,001 | ,798 | ,219 | ,095 | ,314 |
| 2.2. Gestures and attitude towards the audience | ,289 | ,290 | ,226 | ,170 | ,827 |
| 2.2.1. Is confident and relaxed in front of the audience | ,289 | ,290 | ,226 | ,170 | ,827 |
| 2.3. Level of confidence in handling resources | ,478 | ,599 | ,047 | ,282 | -,087 |
| 2.3.1. Uses technological presentation aids to support his/her speech and message. | ,318 | ,689 | ,185 | ,260 | ,090 |
| 3. Can adapt to the audience and establish a fluid interaction with the audience | ,882 | ,122 | ,140 | ,218 | ,164 |
| 3.1. Motivates and engages the audience | ,836 | ,056 | ,060 | ,167 | ,207 |
| 3.1.1. Encourages audience interest and participation. | ,624 | ,260 | ,227 | ,128 | ,353 |
| 3.2. Audience management and control | ,790 | ,121 | ,121 | ,174 | ,070 |
| 3.2.1. Manages question time, audience interventions and unforeseen circumstances. | ,591 | ,356 | ,311 | ,169 | ,232 |
| 4. Is able to use quality technology resources and integrate them into the message | ,397 | ,269 | ,244 | ,799 | ,072 |
| 4.1. Quality of technological resources | ,476 | ,403 | ,271 | ,520 | -,055 |
| 4.1.1. Develops quality technological resources | ,378 | ,482 | ,373 | ,463 | ,035 |
| 4.2. Presentation formalities | ,247 | ,060 | ,113 | ,868 | ,135 |
| 4.2.1. Complies with timing and other presentation requirements | ,052 | ,118 | ,185 | ,848 | ,199 |

As can be seen below, the different elements of the rubric are grouped into factors with internal cohesion which assess specific competences of the general competence of oral communication (Table 4).

**Table 4**. Grouping the elements of the rubric into factors.

| Factors | Ítems |
|---|---|
| Factor 1. Relationship with the audience | 3. Can adapt to the audience and establish a fluid interaction with the audience.<br>3.1. Motivates and engages the public.<br>3.1.1. Encourages audience interest and participation.<br>3.2. Audience management and control.<br>3.2.1. Manages question time, audience interventions and |

| Factors | Ítems |
|---|---|
| | unforeseen circumstances. |
| Factor 2. Confidence when communicating and information transmitted. | 1.1. Quantity and relevance of information.<br>1.1.1. The information is scientifically appropriate and accurate.<br>2. Is able to confidently present a message to an audience.<br>2.1. Oral expression.<br>2.1.1. Speaks clearly and with good intonation at all times.<br>2.3. Level of confidence in handling resources<br>2.3.1. Uses technological presentation aids to support his/her speech and message. |
| Factor 3. The relevance and structuring of the contents of the message. | 1. Sufficient relevant and well-structured content is presented.<br>1.2. Extent to which the message is structured.<br>1.2.1. Is able to present a structured message. |
| Factor 4. Mastery of technological resources and time management of the presentation. | 4. Is able to use quality technology resources and integrate them into the message.<br>4.1. Quality of technological resources.<br>4.2. Presentation formalities.<br>4.2.1. Adaptation to time and other exposure requirements. |
| Factor 5. Gestures and management of the presentation space. | 2.2. Gestures and attitude towards the audience<br>2.2.1. Is confident and relaxed in front of the audience |

There are some items where teachers are not entirely consistent in the way they assess and therefore there is still work to be done. This is the case for item 4.1.1. "Develops quality technological resources", which could be omitted because the value of the rotated matrix is lower than 0.5. In addition, the Student's t-test for independent samples can be used to analyse whether there are significant differences between the means of the two groups. Table 5 shows the means of all the items by group.

**Table 5**. T-test for comparison of means by group of origin.

| | Group var. | N | Media | SD | Standard error of the mean |
|---|---|---|---|---|---|
| Score | A | 208 | 87,05 | 16,867 | 1,170 |
| | B | 300 | 90,01 | 12,158 | ,702 |
| 1. Sufficient relevant and well-structured content is presented. | A | 208 | 89,02 | 16,495 | 1,144 |
| | B | 300 | 90,00 | 14,869 | ,858 |
| 1.1. Quantity and relevance of information | A | 208 | 87,82 | 22,007 | 1,526 |
| | B | 300 | 89,56 | 19,710 | 1,138 |
| 1.1.1. The information is scientifically appropriate and accurate | A | 203 | 89,98 | 17,340 | 1,217 |
| | B | 294 | 91,38 | 15,127 | ,882 |
| 1.2. Extent to which the message is structured | A | 208 | 88,94 | 20,736 | 1,438 |
| | B | 300 | 90,45 | 16,508 | ,953 |
| 1.2.1. Is able to present a structured message | A | 205 | 90,24 | 17,840 | 1,246 |
| | B | 298 | 91,05 | 14,795 | ,857 |
| 2. Is able to confidently present a message to an audience. | A | 208 | 90,14 | 15,321 | 1,062 |
| | B | 300 | 90,76 | 13,366 | ,772 |
| 2.1. Oral expression | A | 208 | 92,79 | 15,587 | 1,081 |
| | B | 300 | 93,22 | 15,730 | ,908 |
| 2.1.1 Speaks clearly and with good intonation at all times. | A | 208 | 92,79 | 15,587 | 1,081 |
| | B | 297 | 94,16 | 12,688 | ,736 |
| 2.2. Gestures and attitude towards the audience | A | 208 | 87,82 | 20,228 | 1,403 |
| | B | 300 | 87,33 | 18,557 | 1,071 |
| 2.2.1. Is confident and relaxed in front of the audience | A | 206 | 88,67 | 18,362 | 1,279 |
| | B | 298 | 87,92 | 17,175 | ,995 |
| 2.3. Level of confidence in handling of resources | A | 208 | 59,62 | 44,966 | 3,118 |
| | B | 300 | 91,45 | 16,496 | ,952 |
| 2.3.1. Uses technological presentation aids to support his/her speech and message. | A | 146 | 89,50 | 19,079 | 1,579 |
| | B | 299 | 91,75 | 15,649 | ,905 |
| 3. Can adapt to the audience and establish a fluid interaction with the audience. | A | 208 | 52,16 | 45,096 | 3,127 |
| | B | 300 | 84,17 | 24,120 | 1,393 |

**Table 5 (cont.)**. T-test for comparison of means by group of origin.

| | Group var. | N | Media | SD | Standard error of the mean |
|---|---|---|---|---|---|
| 3.1. Motivates and engages the audience. | A | 208 | 51,44 | 45,378 | 3,146 |
| | B | 300 | 83,67 | 26,499 | 1,530 |
| 3.1.1. Encourages audience interest and participation. | A | 145 | 84,60 | 23,577 | 1,958 |
| | B | 285 | 88,66 | 17,241 | 1,021 |
| 3.2. Audience management and control | A | 208 | 31,89 | 45,318 | 3,142 |
| | B | 300 | 75,11 | 37,516 | 2,166 |
| 3.2.1. Manages question time, audience interventions and unforeseen circumstances. | A | 92 | 88,41 | 24,922 | 2,598 |
| | B | 256 | 90,76 | 15,523 | ,970 |
| 4. Is able to use quality technological resources integrated with the message. | A | 208 | 83,13 | 30,817 | 2,137 |
| | B | 300 | 91,83 | 15,541 | ,897 |
| 4.1. Quality of technological resources | A | 208 | 59,62 | 45,559 | 3,159 |
| | B | 300 | 88,89 | 21,523 | 1,243 |
| 4.1.1. Develops quality technological resources | A | 151 | 85,21 | 27,925 | 2,272 |
| | B | 293 | 91,01 | 16,746 | ,978 |
| 4.2. Presentation formalities | A | 208 | 81,49 | 35,525 | 2,463 |
| | B | 300 | 90,00 | 25,863 | 1,493 |
| 4.2.1. Complies with timing and other presentation requirements | A | 193 | 91,45 | 21,457 | 1,544 |
| | B | 286 | 94,93 | 15,119 | ,894 |

It can be seen that in almost 'all items', group B outperforms group A except in item 2.2. 'Gestures and attitude towards the audience'. In the confirmatory study, the bilateral significance of the Student's t-test confirms the previous statement with a value of less than 0.05, with significant mean differences in the variables of the confirmatory study: overall score of the whole rubric, confidence in the handling of resources, adaptation to the public and adaptation to the audience and, moreover, in addition to items related to the use of technological resources. Figure 2 shows all the information related to these items.

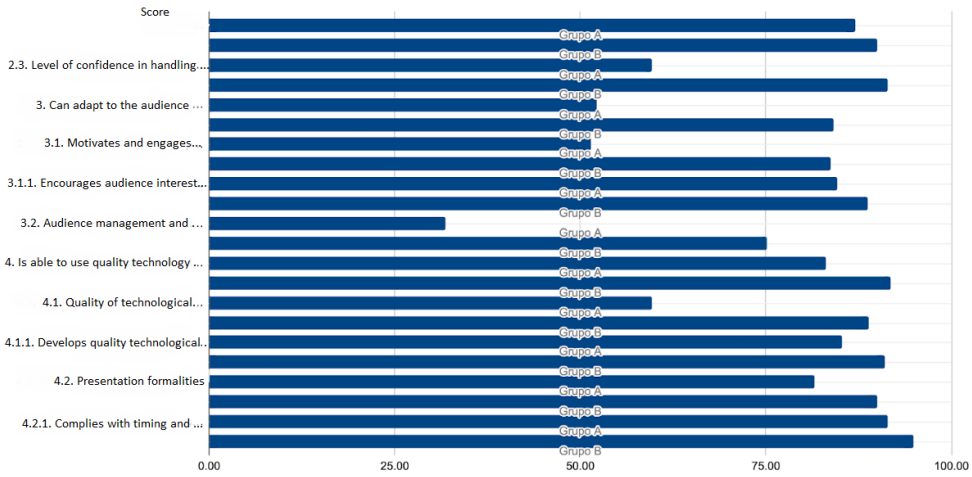


**Figure 2**. Figure with items and scores.

## 3. Conclusions

Through this collaborative assessment method with CoRubric.com and the discussion around communicative assessment in the classroom, the teachers were able to share their assessments and align themselves amongst themselves and the teacher with the various exercises in progress. This is similar to other studies (Serrano-Angulo & Cebrián-de-la-Serna, 2011) where in a peer assessment of 14 presentation teams they aligned themselves with the teacher as the presentations progressed, although in this case they were student teachers. In short, "the more the rubric is used, the better the criteria and their application are internalised". In that particular experience, the initial peer assessments were higher than those of the teacher. In the course of assessing the teams and analysing the results of the assessments, including why the teacher had applied them, the students became increasingly more aligned with the teacher's assessment. This means that the more practice they had with the same rubric, the more they internalised the criteria and their application. In contrast, in the present study, this was true for half of the assessments (here there were 7 assessments or teams compared to 14 assessments or teams in the other study), which not only matched the teacher's assessment, but also had a Cronbach's alpha coefficient of 0.953, slightly higher than the instrument itself, which had been validated by experts (Fernández-Medina et al., 2021). However, there are some themes and items, such as being “able to use quality technological resources integrated with the message" (p. 77), that need further work to achieve a more consistent view of the text and its application to different situations. As a limitation, we could mention the difficulty teachers had with the more complex training topics. However, we believe that we have been able to achieve greater cohesion and therefore internalise and train teachers in digital competency in order to share criteria and assess projects together. Thus, the research objective has been met; consistency has been achieved in all elements of a rubric when applied to the same exercise by all teachers participating in an in-service course, and therefore the null hypothesis is disproved. We can thus conclude that the work presented here is a valid general strategy for teacher training. This strategy can include, as in this case, the help of an expert, techniques in the use of spacing, as well as retrieval learning practices, which we hope will improve learning in different areas and throughout people's

working lives (Carpenter et al., 2022). Clearly, more work needs to be done on methodological procedures and techniques that make it easier for teachers to quickly read and interpret their best practices, and new emerging technologies should continue to be incorporated into assessment platforms for digital rubrics. Further studies are also needed that combine different technologies and more active and motivational techniques, such as gamification and badges with rubrics.

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