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Towards engaging students in curriculum transformation: What are the effective characteristics of rubrics?

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Rubrics are tools commonly used by educators to accurately and consistently mark student assessments and communicate achieved learning outcomes. The teachers, having a clear understanding of the assessment's intended learning outcomes, have traditionally constructed rubrics; however, an enhanced shared understanding of an assessment's outcomes has the potential to be achieved if rubrics are developed as a collaboration between staff and students. Such practices provide potential for assessment, and its subsequent feedback, to be more highly valued by students not simply as an end-point, but rather as an opportunity for them to be active in their own learning, this becoming a curriculum transformation. This paper reports on the first phase of a project, funded by an Office for Learning and Teaching (OLT) Innovation and Discovery Grant: *Owning the rubric: Student engagement in rubric design, use and moderation*. Phase 1 of the project involved the identification of Effective Rubric Characteristics (ERCs) through a literature-evidenced approach that subsequently informed the formation of an Effective Rubrics Characteristics Questionnaire (ERCQ). The ERCQ was piloted with a small group of experienced users and then it was administered to a group of assessment and rubric experts to establish the key attributes of effective rubrics using a modified Delphi technique.

Keywords: rubrics, co-construction, engagement, assessment transformation

Introduction

The project, *Owning the rubric: Student engagement in rubric design, use and moderation* is a long term project looking at the means to engage students in the design and construction of assessment rubrics. The overall aim of this project is to encourage innovative teaching practices where students have greater ownership of their own learning through active involvement in the assessment process. Such practices provide opportunities for assessment to become more valuable to students as a tool for instruction and learning, rather than simply used as an evaluative end-point. The first phase of a four-phase project has been completed and this paper reports on the project's findings to date, specifically establishing the

characteristics of an effective rubric. This was achieved through the design of a questionnaire, informed by a literature review, and the presentation of this questionnaire to a panel of experts using a Delphi method, the results of which guided the development of an inventory of rubric characteristics. The findings of the project's preliminary phase provide interesting insights into the characteristics of a quality rubric.

Background

A rubric may be defined as a “type of matrix that provides scaled levels of achievement or understanding for a set of criteria or dimensions of quality for a given type of performance” (Allen & Tanner, 2006, p. 197). As Dawson (2015) states, although the use of rubrics are often mandated by educational departments and institutions, this is done “without providing a working definition of the term [*rubric*], leaving it open to a very diverse array of interpretations” (p. 2). They are widely used for a range of assessment types at many levels of education and in a variety of disciplines (Andrade, Andrade, & Wang, 2008; Reddy & Andrade, 2010). Rubrics can be applied holistically where a teacher marks an assessment based on an emergent global judgement, or analytically where a teacher provides separate judgements on several criteria (Jönsson & Svingby, 2007; Sadler, 2009). The use of rubrics in practice can vary from a simple scoring sheet held by teachers until the time of grading, to those having full descriptors of desired outcomes that are developed by students prior to an assessment starting (Andrade & Ying, 2005; Dawson, 2015). Rubrics are commonly used by teachers as assessment tools, but are also used as valid and reliable tools for student peer-assessment (Hafner & Hafner, 2003).

Teachers benefit from using rubrics to accurately, consistently and quickly mark student assessments with transparency. Rubrics can promote greater objectivity in communicating the level to which a student has achieved the learning outcomes (Bharuthram, 2015; Stevens & Levi, 2011; Wolf & Stevens, 2007). Rubrics also have many benefits for students. A well-constructed rubric allows students to identify critical issues, and can help students to reduce their anxiety about expectations, focus their efforts, determine time expectations, self-evaluate their own work against teacher expectations, and estimate their grade prior to submission (Andrade & Ying, 2005; Panadero & Jönsson, 2013; Reddy & Andrade, 2010). These benefits promote an improvement of work quality and allow students to earn better grades (Panadero & Romero, 2014). When applied in these ways, a rubric becomes more than simply a summative assessment tool for assigning grades; a rubric can become useful as an instructional tool to promote student learning through self-assessment and self-reflection (Panadero & Jönsson, 2013; Panadero & Romero, 2014).

Rubrics have traditionally been constructed by teachers who have an understanding of an assessment's intended learning outcomes and standards; however, these may not be clear to the students despite them often being solely dependent on supplied rubrics for their understanding of teacher expectations (Andrade, 2005). Articulation of these expectations can be particularly poor when teachers employ ambiguous language, use academic discourse unfamiliar to students, emphasise their personal demands rather than representing discipline standards, or choose assessment criteria that are not aligned with the required outcomes of the task (Andrade & Ying, 2005; Jönsson, 2013; Li & Lindsey, 2015). Benefits of rubrics, as instructional tools, may also be lost as many students do not actually read rubrics in their entirety or are not sufficiently trained in how to productively use them for their own learning (Andrade & Ying, 2005; Jones, Allen, Dunn, & Brooker, 2016; Jönsson, 2014; Reddy & Andrade, 2010). To more effectively use rubrics, teachers and students need to develop a

shared understanding of the potential rubrics offer for providing ‘feed-forward’ learning experiences rather than treating rubrics simply as tools for the provision of ‘feedback’ (Bevan, Badge, Cann, Willmott, & Scott, 2008; Burke, 2009; Jönsson, 2013). Even if teachers are intentional in their attempts to explain to students how rubrics are most effectively used, most rubrics are essentially teacher-driven.

Leaders in assessment research emphasise the importance of “creating opportunities for students to develop capabilities to operate as judges of their own learning” (Boud & Molloy, 2013, p. 698). When provided with these opportunities, there is often an improvement in student performance as a clearer understanding of expectations is achieved. For example, Becker (2016) found that students who were involved in the development or implementation of a scoring rubric outperformed those that only sighted, or were not provided with, the rubric. Having students involved in the development of a rubric provides opportunities to discuss how to best use rubrics for improving performance prior to the completion of an assessment task so students can use these learning experiences to ‘feed-forward’ for the purpose of improving the quality of their work (Burke, 2009; Jönsson, 2013). The process of co-constructing a rubric also enables students to dialogue with their teachers so that expectations are clear and rubrics are produced using appropriate language and consistency in discipline standards, while also ensuring that assessment criteria are aligned to the required outcomes (Andrade & Ying, 2005; Li & Lindsey, 2015; Sundeen, 2014). Furthermore, it is clear that there are inappropriate practices in rubric co-construction and use to be avoided but, more importantly, there are also effective practices to be promoted. It is therefore an imperative to establish guidelines for the development and use of rubrics to ensure they are designed and administered optimally.

Methodology

The methodological approach used in this study incorporated a Structured Literature Review (SLR) (Dumay, Bernardi, Guthrie, & Demartini, 2016) and a modified Delphi technique (Skulmoski, Hartman, & Krahm, 2007, p. 3) to identify a collection of effective rubric characteristics (ERCs) which then formed the basis of the Effective Rubric Characteristic Questionnaire (ERCQ) and the Effective Rubric Characteristic Inventory (ERCI). These processes are now described in more detail.

Structured Literature Review (SLR)

Phase 1 of this study involved the development of a tool with which to carry out a modified Delphi technique. The initial step of this process was to define a protocol for conducting a Structured Literature Review (SLR) (Dumay et al., 2016). The SLR was collaboratively produced by a multidisciplinary team from several institutions utilising a Google spreadsheet. This resulted in an array consisting of attributes for the SLR protocol listed down the left-hand column with an additional column for each team member to comment on each attribute. Using an online format enabled the whole team to contribute to the SLR protocol attributes without the need for meetings or repeated emails. The team's suggestions were considered and incorporated into the SLR.

During the initial planning stage, a set of themes about rubrics relating to the research questions were developed. Equipped with the SLR protocol, a literature review was conducted, consisting of eight themed annotated bibliographies, each of which focused on a different aspect of rubrics and their characteristics. The purpose of the rubric-focused

literature review was to identify a collection of effective rubric characteristics (ERCs) as reported in recent scholarly literature. The identified characteristics were formed into a list of ERCs, allowing the team to see the characteristics as they were added by other team members and so avoiding repetition and supporting an effective collaborative process.

Modified Delphi method

The resulting list of ERCs, drawn from the literature review, formed the basis for the development of an ERCQ (see Figure 1). In the ERCQ, the ERCs were grouped into categories including: purpose of rubrics; marking criteria; performance levels; performance descriptors; scoring; feedback narrative; rubric developers; and rubric application. The categories logically grouped the characteristics for rating their effectiveness and, furthermore, allowed the rather long list of ERCs (75) to be organised into pages, providing some relief from lengthy scrolling. Once completed to the team's satisfaction, the design was applied in an online setting using Survey Monkey.

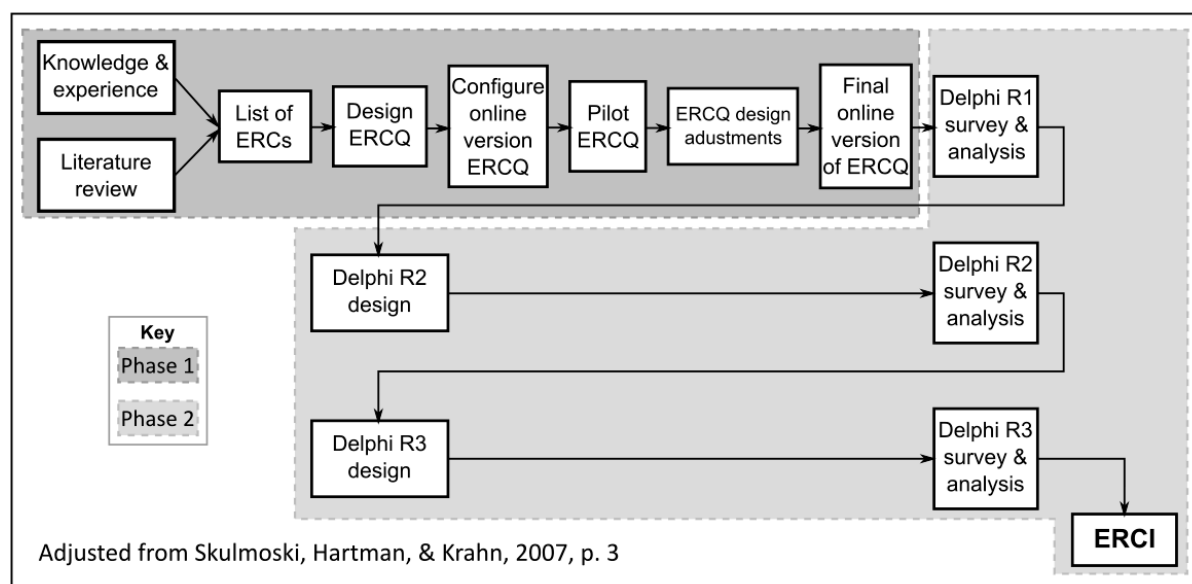


Figure 1: Flow diagram of the *modified* Delphi technique used in this study

Initially the ERCQ was piloted with a small group of teaching academics conversant with rubric use for the purpose of gauging user comprehension, and other aspects of questionnaire design and deployment. The pilot participants provided notations about their experience to the ERCQ administrators and the ERCQ was modified to accommodate their suggestions.

Next, the final version of the ERCQ was administered to an assessment and rubric expert group, including national and international experts, in two rounds of online surveys which comprised the modified Delphi technique (Figure 1). The Delphi technique was selected because it is an efficient and feasible method to obtain relevant knowledge about a particular topic from a collection of experts who do not necessarily need to be brought together physically (Keeney, Hasson, & McKenna, 2006). This technique is often used to promote innovation by gathering expert advice within interdisciplinary research contexts and it has been shown to be particularly useful in achieving consensus within a process of controlled feedback (Powell, 2003). The credibility of the expert panel is important to ensure the validity of the results (Robson, 2011, p. 365). As Skulmoski et al (2007) explain, the Delphi method is

an iterative process to collect and distil the anonymous judgments of experts. Furthermore, Skulmoski (p. 5) describes how the technique has evolved into a flexible research method, concluding that there is no “typical” Delphi; rather that the method may be modified to suit the circumstances and research question.

The expert group consisted of the project's expert panel, which had been pre-invited and had agreed to participate, and a number of other rubric experts sourced from across the compendium of authors which emerged during the literature review (bringing the invited participant pool to 20-25 experts in all). The formation of Round 1 in a classical Delphi technique most often involves the participants in defining the items which they will rate and then come to a consensus in the upcoming rounds. In this study, it was considered expedient to devise the initial ERCs from the literature and proceed straight into the rating and consensus rounds. However, there was opportunity for the Delphi participants to add further ERCs to the ERCQ. This adjustment to the Delphi technique allowed the usual Round 1 to be skipped, alleviating the requirement for the expert group to create the initial list of ERCs afresh. In this instance, two benefits were achieved in formulating the Delphi this way: reducing the participants' cognitive load of devising an exhaustive list of ERCs; and reducing the number of rounds, and consequently the time required, to complete the Delphi process. In this study, the expert group members were provided with two rounds of online surveys during which they provided their responses to a collection of ERCs by indicating varied levels of agreement or disagreement. From this process, a set of research-informed and expert-sanctioned rubric characteristics was developed, referred to in this project as the Effective Rubric Characteristic Inventory (ERCI).

Results

Three sets of data were gathered throughout the study's first phase. These data were analysed specifically to answer the following research question: *What are the characteristics of effective rubrics?* Results of these analyses provided findings in three formats:

1. the initial ERCQ, made up of ERCs, that was the outcome of the rubric-focused structured literature review;
2. the responses to the initial ERCQ from the small pilot group of teaching academics that were used to refine the ERCQ into its finalised format; and
3. the responses from the expert group to the finalised ERCQ that were gathered through Round 1 and Round 2 of the Delphi technique, used to form the ERCI.

Together, these data were synthesised to form the ERCI which will be used as a guide to ‘best practice’ in the future phases of the project when students and teachers will engage in the co-construction and use of rubrics.

1) The Effective Rubric Characteristics Questionnaire (ERCQ)

An initial version of the ERCQ, developed during Phase 1 of the study, was based on an extensive rubric-focused structured literature review that identified previously reported elements of an effective rubric within a higher education context. The questionnaire, in effect, formed part of the results of this study in that it formed the outcome of the literature review.

The ERCQ comprised a mixture of open-ended and Likert-style items to elicit expert opinion on the most agreed-upon characteristics of effective rubrics. The eight themes that emerged from this literature review formed key categories within the initial version of the ERCQ. These categories, along with a selection of sample items, are outlined in Table 1.

Table 1: Categories and sample items in the initial version of the ERCQ

Category	Sample item/s
Purpose of rubrics	Rubrics are useful for providing focused instruction. Rubrics help provide quality feedback to students.
Marking criteria	Rubric marking criteria should provide guidance to students about how to complete an assessment. Rubric marking criteria should align with the learning outcomes of an assessment.
Performance levels	Headings used to describe performance levels should have a qualitative descriptor only (e.g., below average, average, above average etc.). There should be continuity from one performance level to the next.
Performance descriptors	Performance descriptors should be informative of what is good and bad work. Performance descriptors should be worded concisely.
Scoring	An effective rubric can have different weightings allocated to each criterion. A numerical score should be provided for each criterion.
Feedback narrative	Feedback comments should be provided throughout a submitted assessment task. Effective rubrics should have a concluding section for individualised narrative feedback to be provided.
Rubric developers	Language is more clearly understood by students when teachers and students share in the writing of a rubric. Co-creating rubrics helps to develop more meaningful assessments.
Rubric application	A rubric should be provided to students prior to them starting an assessment. An effective rubric provides students with the opportunity to self-evaluate their own work before submission.

2) Responses to the pilot Effective Rubric Characteristics Questionnaire (ERCQ)

Once the initial version of the ERCQ was constructed, responses to each of the ERCQ items were sought from a pilot group of six academic staff from a range of disciplines. Based on the pilot participants' feedback, modifications were made to the ERCQ to improve the clarity of a number of items: the labelling of Likert-scales was made more consistent, references to students and/or teachers were modified in the wording of some of the items, and a labelled rubric diagram (see Figure 2) was inserted with descriptors that corresponded to some sections of the ERCQ.

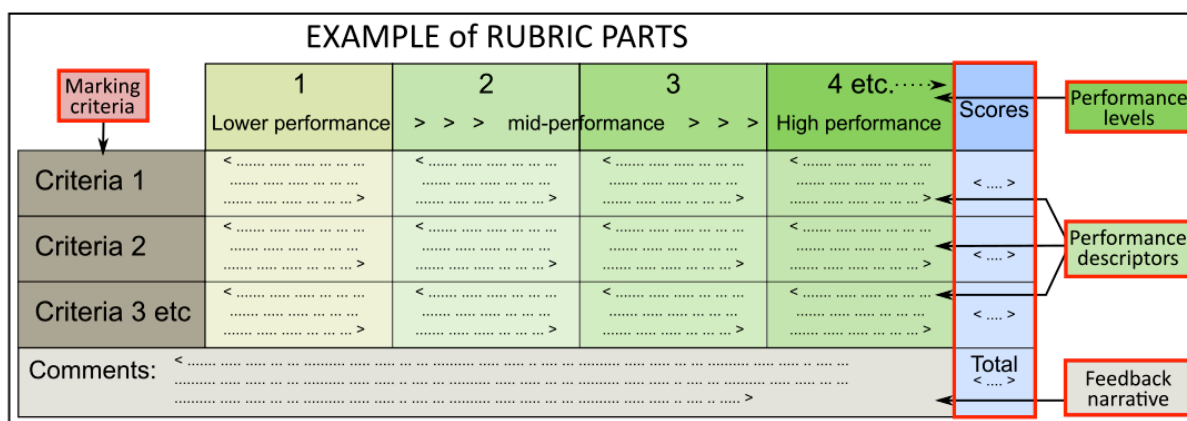


Figure 2: Explanatory rubric diagram used in ERCQ

3) Responses to the finalised Effective Rubric Characteristics Questionnaire (ERCQ)

Towards the end of Phase 1 of the project, the ERCQ was administered to an expert group to establish agreement upon the attributes of effective rubrics. These 20-25 international rubric experts were drawn from a range of projects and publications that had previously investigated the use of rubrics as instructional devices for students and the construction of rubrics for learning and teaching purposes. Using a modified form of Skulmoski et al.'s (2007) Delphi technique, as outlined in Figure 1, the experts were requested to record the extent of their agreement or disagreement with a collection of ERCs across two rounds of online surveys.

The findings of Round 1 of the Delphi technique enabled the research team to identify which of the effective rubric characteristics were met with the highest level of agreement through consultation with the expert group. In Round 1, the research team used an 80% and above agreement level to identify a suitable percentage of consensus among the experts combined with a weighted average agreement level of 4.2 and above, based on their responses to the 59 Likert-style items in the survey. The weighted average agreement level of each of the Likert-style items was derived by calculating the average numerical rating (from 1 = strongly disagree, through to 5 = strongly agree) of agreement levels given by the expert group. The percentage agreement levels were calculated by combining the percentages of responses that were categorised as Agree (4) or Strongly Agree (5). The experts' responses to the 19 short answer and open ended questions provided additional feedback. By the end of the analysis of Round 1 of the Delphi method, 29 ERCs were confirmed by consensus from the experts and nine ERCs remained that required further expert feedback during Round 2.

In Round 2, the online survey administered to the expert group included nine Likert-style items and five open-ended questions. Each item was designed to elicit commentary from the experts about the viability of the remaining undecided ERCs. In Round 2, only ERCs that attracted a 75% or above overall agreement level or a mean agreement level of 3.5 or above, on a 1 (low agreement) through to 4 (high agreement) scale, were included in the final ERCI. Based on these inclusion and exclusion criteria, six of the nine ERCs in Round 2 were included in the final ERCI, two of which were reworded to form an additional two ERCs, meaning that nine ERCs were added to the ERCI after Round 2 of the Delphi. The finalised format of the ERCI includes 37 ERCs. This inventory, the ERCI, will inform future phases of the study leading to the co-construction and use of co-constructed rubrics by students and lecturers. **Table 2** outlines the final 37 ERCs that were identified by the expert group during Round 1 and Round 2 of the Delphi technique.

Table 2: The 37 effective rubric characteristics (ERCs) from the final Effective Rubric Characteristic Inventory (ERCI)

Category	Effective rubric characteristic
Purpose of rubrics	Rubrics are useful as instructional tools for providing assessment guidelines to students. Rubrics help in providing quality feedback to students. Rubrics are a time-efficient way for teachers to provide feedback to students. An effective rubric reduces marker bias. Rubrics provide indicators for success and descriptions of these indicators. Rubrics provide indicators for success and descriptions of these indicators. Rubrics help focus student effort. Rubrics are useful as assessment tools (e.g., for grading). Rubrics are useful as instructional tools (e.g., for teaching and learning). Rubrics help teachers communicate intended learning outcomes. Rubrics help students to plan their approach to an assignment. Rubrics promote consistent marking of student assessments. Students' use of rubrics improves the standard of their work. The use of rubrics reduces marking subjectivity. The purpose of a rubric is better understood if it is co-constructed by teachers and students.
Marking criteria	Rubric marking criteria should align with the learning outcomes of an assessment.
Performance descriptors	Performance descriptors should be informative of what is good and bad work. Performance descriptors should be worded concisely. Performance descriptors should reflect clear gradations of quality.
Feedback narrative	Students benefit from feedback comments at the end of a rubric.
Rubric development	The effectiveness of a rubric should be tested against benchmarked performance standards. Rubrics should be created not based on personal demands but rather on discipline standards. Rubric creators should be sensitive to the use of academic discourse (e.g. terminology or jargon). Rubric creators should avoid vague and ambiguous language. Peer-marking should occur among teachers to assess the effectiveness of a rubric. The co-construction of a rubric provides learning opportunities for students. Co-creating a rubric allows teachers and students to have a shared understanding of the expectations of an assessment. The wording of a rubric is more clearly understood by students when they are a part of constructing the rubric.
Rubric application	A rubric should be provided to students prior to them starting an assessment. An effective rubric provides students with the opportunity to self-evaluate their own work before submission. The purpose of a rubric should be explained to students. Teachers should receive instruction in how to use the rubric prior to marking. Students should receive instruction in how to use the rubric prior to submission. Examples of exemplar work should be provided to students to illustrate work of high quality. Rubrics do not replace good instruction. Students should be provided with opportunities to practice their use of the rubric (e.g., provision of work of different standards to mark). Students should be encouraged to read the rubric after a grade is provided.

Discussion and implications

The results of Phase 1 of the project provide not only specific direction for the future phases of the project but the results also provide insights into application to other higher education contexts. More importantly, the project thus far has provided deeper insights into the quality of rubrics that should be aimed for in a higher education assessment context. The characteristics of effective rubrics, identified through a combined literature review and Delphi research technique, informed the ERCI which has the potential to establish the basis of future projects involving teachers and students in the co-construction and use of co-constructed rubrics. While rubric characteristics have been noted incidentally in some previously reported research projects (for example, Allen & Tanner, 2006; Jönsson, 2014; Panadero & Romero, 2014), a set of expert-informed characteristics of effective rubrics had not yet been identified before this project was conducted. These characteristics of effective rubrics, identified through consultation with experts in assessment, evaluation and rubrics, have provided a descriptive basis from which guidance can be provided to teachers and students in higher education to recognise rubrics of high quality. By suggesting that such a collection of ERCs be considered by *both* teachers and students, future phases of this project are in line with Boud and Molloy's (2013) concept which espouses the need for students to be more involved in the assessment process.

In considering the work to date, insight has been provided into the impact that rubrics can have on clearly articulating the learning outcomes to students (Bharuthram, 2015; Stevens & Levi, 2011), thus providing clarity of direction for the learner and also an appreciation of where they are in relation to the summative aspects of the assessment item (Reddy & Andrade, 2010). Supporting the student to become an autonomous learner is a primary aim of higher education and the clarity of communicating learning outcomes provides the student with the capacity for informed decision-making which, in turn, promotes autonomy and ownership of learning; with the possibility of manifesting in better grades (Panadero & Jönsson, 2013; Panadero & Romero, 2014).

While much scholarly literature provides considerable evidence to support the use of rubrics and recommends the involvement of students in the process of planning and designing higher education assessment, to date, this has not been done extensively in the higher education context nor has research about student involvement in assessment been conducted in an evidence-based, research-informed way, as has been done in this project. Moreover, in the Australian context, previous research has not enlisted the input of a group of international experts to focus on identifying the characteristics of effective rubrics. The next phases of this project are looking to further enhance the capacity for engaging students in assessment design processes by creating an interface for discourse between the teacher and the student body through the shared development of rubrics.

Conclusion

The results of the initial phase of the study reported in this paper have demonstrated how an inventory (the Effective Rubric Characteristics Inventory, the ERCI) of effective rubric characteristics in higher education contexts was developed using an initial literature-evidenced approach, then supplemented by specialist feedback from an international group of rubric and assessment experts, which was facilitated using a modified Delphi technique. This research-informed approach that guided the development of this inventory represents the collective viewpoint of a group of renowned national and international experts about the most

effective attributes of assessment rubrics in higher education settings. The ERCI may be useful for teachers, students, administrators and curriculum designers in tertiary education to guide the identification of useful rubric elements both during the assessment process as well as throughout periods of rubric construction and rubric evaluation. Thus, the use of the ERCI may provide a catalyst to convert some aspects of a traditional curriculum, in which teachers typically take charge of developing assessment rubrics, into a transformed curriculum in which students and teachers work in partnership to co-construct rubrics. Additionally, this inventory will guide the subsequent phases of the project in which rubrics will actually be constructed in partnership between students and teachers. Anticipated benefits from such a process will be explored in terms of the potential benefits to student learning and ownership of their learning. Furthermore, the practical implications for academic teaching staff and academic developers to transform curriculum design and assessment development processes, by implementing strategies such as those outlined in this paper, will be investigated.

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