Assessing Oral Presentation Performance:

Designing a Rubric and Testing its Validity with an Expert Group

Abstract

Purpose: The purpose of this paper is to design a rubric instrument for assessing oral presentation performance in higher education and to test its validity with an expert group.

Design/methodology/approach: This study, using mixed methods, focuses on (1) designing a rubric by identifying assessment instruments in previous presentation research and implementing essential design characteristics in a preliminary developed rubric and (2) testing the validity of the constructed instrument with an expert group of higher educational professionals (n=38).

Findings: The result of this study is a validated rubric instrument consisting of eleven presentation criteria, their related levels in performance, and a five-point scoring scale. These adopted criteria correspond to the widely accepted main criteria for presentations, in both literature and educational practice, regarding aspects as content of the presentation, structure of the presentation, interaction with the audience and presentation delivery.

Practical implications: Implications for the use of the rubric instrument in educational practice refer to the extent to which the identified criteria should be adapted to the requirements of presenting in a certain domain and whether the amount and complexity of the information in the rubric, as criteria, levels and scales, can be used in an adequate manner within formative assessment processes.

Originality/value: This instrument offers the opportunity to formatively assess students' oral presentation performance, since rubrics explicate criteria and expectations. Furthermore, such an instrument also facilitates feedback and self-assessment processes. Finally, the rubric, resulting from this study, could be used in future quasi-experimental studies to measure students' development in presentation performance in a pre- and post-test situation.

Keywords: Oral presentation competence; Rubrics; Feedback; Assessment; Instruction; Higher education

Paper type: Research paper

Introduction

The ability to present is frequently considered as one of the core competencies for higher educated professionals irrespective of domain (Kerby and Romine, 2009; Van Ginkel *et al.*, 2015a). In the higher education context, this competence is perceived as essential for effective performance of graduates in various working environments, for career success and for effective participation in a democratic society (Chan, 2011; Smith and Sodano, 2011). Furthermore, presenting is acknowledged by policy makers around the world as an essential attribute (Van Ginkel *et al.*, 2015a). This emphasis is reflected in the Dublin Descriptors, in which one of the five higher education qualifications refers to 'communicating' (Washer, 2007). Presenting serves different functions in providing messages to, or interacting with, audiences, like informing or persuading (De Grez, 2009). Although this competence is required in various professional fields, graduates often lack the ability to speak in public (Chan, 2011). De Grez (2009) defines this competence as *"a combination of knowledge, skills and attitudes needed to speak in public in order to inform, self-express, relate, or to persuade"* (p. 5). In order to acquire such a competence, the cognitive, behavioural and affective components related to presenting should be taken into consideration (Bower *et al.*, 2011; Mulder, 2014), since students' performances can be enhanced or inhibited by any one or all of these components. Therefore, higher education curricula should be designed to address all these elements in their learning environments for developing presentation skills and communication competencies (Van Ginkel *et al.*, 2015a).   A recently conducted systematic review identified seven design principles for developing oral presentation competence of which three relate to formative assessment processes (Van Ginkel *et al.*, 2015a). These principles include the provision of feedback, peer assessment and self-assessment as crucial strategies for constructing effective learning environments in order to develop academic and communication skills in higher education (Asghar, 2010; Falchikov, 2005; Hattie and Timperley, 2007) and, more specifically, oral presentation competence (De Grez *et al.*, 2009a; Van Ginkel *et al.*, 2015a). Although presentation competence is assessed in a wide range of higher education institutions within various domains and countries (Kerby and Romine, 2009; Pittenger *et al.*, 2004; Reitmeier and Vrchota, 2009), an adequate assessment instrument, validated from both a scientific and educational practice perspective, is currently lacking. Firstly, it is difficult to assess students' oral presentation skills in curricula in higher education, since widely validated assessment instruments are not yet developed. Previous researchers (e.g. Bower *et al.*, 2009; De Grez *et al.*, 2009b; Reitmeier and Vrchota, 2009) used instruments for assessing presentation

skills (1) without relating the adopted criteria (like 'structure of the presentation' and 'presentation delivery') to findings in other publications in this field of research and (2) without checking the use of the rubric for formative assessment with insights from presentation experts in higher education. Therefore, criteria and their related performance levels should be embedded in theories about encouraging presentation skills in higher education. Secondly, an adequate and validated assessment instrument, offering opportunities for developing students' oral presentation skills in practice, could facilitate feedback and self-assessment processes (Jonsson and Svingby, 2007). The challenge to design effective and efficient formative processes is evident in many curricula around the world, since pressure in terms of opportunities for feedback are frequently recognized by scholars when class sizes increase, teaching staff becomes overloaded and possibilities for teacher-student interaction diminish (Boud and Molloy, 2013; De Grez *et al.*, 2009a; Higgins *et al.*, 2002). Taking these scientific and educational practice perspectives into consideration, rubrics serve as suitable instruments in higher educational assessment processes that explicate criteria and expectations (Rezaei and Lovorn, 2010). Therefore, criteria and related performance levels should be specifically formulated to aid teachers and researchers in assessing students' presentation performance and to provide specific feedback to the feedback receivers. Moreover, students perceive specific feedback as more useful than non-specific feedback (Shute, 2008) and could, thus, by receiving feedback based on these criteria and levels, more easily improve their presentation skills. Furthermore, rubrics facilitate feedback and self-assessment processes (Jonsson and Svingby, 2007) which could further encourage the development of students' academic and communication competencies. Finally, such instruments could be used in future quasi-experimental studies to measure students' development in presentation performance in a pre- and post-test situation. Thus, the goal of this study is to design a rubric instrument for assessing oral presentation performance in higher education and to test its validity with an expert group. Firstly, relevant literature, derived from a previously conducted systematic review, has been selected and analysed with the goal to identify crucial design characteristics of rubrics and to construct a preliminary rubric assessment instrument for developing oral presentation performance. Secondly, an empirical study, by using mixed methods, has been conducted in order to elicit the perceptions of higher educational experts from differing domains and countries on the constructed rubric instrument.

Theoretical background

First of all, this section describes findings based on a literature review directed to identify rubric assessment instruments within the field of research about presenting. Secondly, this section summarizes, based on examples of rubrics in the literature, commonly adopted design characteristics of rubrics and suggests strategies for further developing a preliminary constructed rubric instrument for assessing oral presentation performance.

In this research field, a systematic literature review was conducted to synthesize previously studied learning environment characteristics into a comprehensive set of educational design principles for developing oral presentation competence in higher education (Van Ginkel *et al.*, 2015a). Based on a selection of 52 publications derived from the last 20 years, the following crucial learning environment characteristics were formulated: learning objectives, learning task, behaviour modelling, opportunity to practice, provision of feedback, peer assessment an self-assessment. These results disclosed that three of the seven design principles were related to the process of formative assessment, including the provision of feedback, peer assessment and self-assessment. For this study, 35 of the 52 publications of this review were critically analysed, since these studies focus on formative assessment strategies for developing students' presentation skills. The goals were (1) to identify for which purpose potential rubrics were used in these studies and (2) to formulate potential design characteristics of these rubrics for developing a preliminary rubric and further testing its validity among experts in higher education. Regarding the role of rubrics in these selected studies, the assessment instruments were used for both (1) assessing students' actual presentation performance and (2) delivering content-rich feedback in peer feedback processes and self-assessment, since these instruments explicate expectations through performance levels related to each presentation criterion (e.g. Carroll, 2006; De Grez *et al.*, 2009a; Young and Murphy, 2003). Firstly, several researchers emphasized that the way feedback is provided affects students' development in oral presentation performance (e.g. De Grez et al., 2009b; Kerby and Romine, 2009). Other researchers concluded, based on empirical research, that rubrics could help to provide explicit feedback to ensure that reflective learning takes place, which is conditional for developing presentation skills (Bower *et al.*, 2011; Carroll, 2006). Secondly, rubrics are considered as valuable in peer assessment. Peers assessing other students' presentations also encourage students' own performance by paying explicit attention to required performance criteria, related levels and scoring scales (e.g. Carroll, 2006; De Grez *et al.*, 2009b). Thirdly, several researchers addressed the importance of adopting rubrics for the facilitation of self-assessment (e.g. De Grez *et al.*, 2009a; Reitmeier and Vrchota, 2009). In most studies, self-assessment is considered as a process by which students monitor and evaluate their own presentation performance,

through videotaping and written portfolios, to provide useful self-feedback and to find strategies for improving their future performance. The use of rubrics could encourage self-assessment as an essential step in reflection and learning cycles (Reitmeier and Vrchota, 2009) in addition to other essential stages within these cycles, such as 'practicing presentations' and 'reflection on presentation of others'. Based on the earlier mentioned systematic review (Van Ginkel *et al.*, 2015a), 35 of the 52 selected studies focused on formative assessment strategies for developing students' presentation competence (Bower *et al.*, 2011; Hay, 1994; Houde, 2000). In 18 of these 35 articles, concrete assessment instruments were described, concerning presentation criteria and their related scoring scales (King *et al.*, 2000; Pittenger *et al.*, 2004; Taylor, 1992). Of these 18 publications, seven articles adopted rubric instruments for assessing oral presentation performance (De Grez *et al.*, 2009a; De Grez *et al.*, 2009b; Young and Murphy, 2003). Further, three of these seven articles additionally showed a concrete example of the rubric and thus communicated the characteristics of the rubric assessment instrument in an explicit manner to their reading audience (Carroll, 2006; Kerby and Romine, 2009; Reitmeier and Vrchota, 2009).

Firstly, considering the 18 publications describing assessment instruments for developing oral presentation competence, the following four main criteria were reflected in all of these articles (Bower *et al.*, 2011; De Grez *et al.*, 2009b; Hay, 1994): the content of the presentation, the structure of the presentation, the interaction with the audience and the presentation delivery (e.g. eye contact, posture and gestures, use of voice).

Secondly, regarding the description of the levels corresponding to the criteria, the following findings, based on an analysis of the rubrics in the selected publications can be drawn. The levels were formulated in a positive, constructive and active (in terms of action verbs) manner and were specifically related to sub criteria derived from the main criteria for presenting.

Thirdly, although differing scales have been used in general assessment instruments for developing presentation competence, all examples of the rubrics in the publications adopted a five-point scoring scale. Taking these three characteristics of rubric instruments and their specific elaborations in the field of presentation research into consideration, the following strategies for revision of a previously used rubric in Dutch university presentation courses were implemented with the goal to construct a rubric instrument embedded in theory (see *Appendix*): (1) the criterion 'content of the presentation' was divided into two aspects concerning 'internalizing the subject in the presentation' and 'connecting the subject of the presentation with prior knowledge of the audience'; (2) all levels were checked and, if needed, adapted

concerning the formulation in a positive, constructive and active manner; (3) the number of scoring scales in the rubric was increased from four to five levels reflecting a balance between the higher and lower scores comparable to previously published rubric examples.

Thus, based on a previously conducted systematic review (Van Ginkel *et al.*, 2015a), three characteristics of rubrics (criteria, levels and scales) and their specific elaborations in this field of research could be identified. Further, based on a comparison of these characteristics of rubrics with a previously adopted rubric instrument in Dutch presentation courses, three strategies for improvement were formulated. Taking these findings together, a rubric instrument was constructed based on the insights from the literature. In order to further validate this instrument, perceptions from higher educational experts towards this rubric will be elicited in this study by adopting mixed methods, while explicitly focusing on the applicability of the instrument in formative feedback processes within higher educational practice.

Method

Participants

For validating the rubric instrument, higher educational experts (n=38), from various universities around the globe, participated voluntarily in one of the four interactive sessions at national (Dutch) or international (European and global) conferences. Considering the three expert selection criteria, the authors decided to initiate four workshops focusing on testing the validity of a designed rubric 'oral presentation skills' on conferences on the interface of scientific research and educational practice for higher educational experts from different counties (e.g. United States, Australia, United Kingdom, Finland, the Netherlands, Belgium and Spain) within various domains (e.g. Business, Health, Communication, Education and Agriculture).

Regarding the selection of higher educational experts for the sample of this study, the following selection criteria and related arguments were decisive. Firstly, experts should have expertise and experience, besides conducting research, in designing and providing education for students on the higher education level, because their perceptions towards criteria, levels and scale of the designed rubric should be valuable for both measuring students' presentation performance as well as for adopting rubrics in feedback processes. Secondly, experts should have different backgrounds in terms of domain, since previous studies (e.g. Hay, 1994; King *et al.*, 2000; Reitmeier and Vrchota, 2009) revealed that fostering oral presentation performance

is an essential objective in various domains of higher educational curricula. A recently published systematic review in this field (Van Ginkel *et al.*, 2015a) revealed that in the last twenty years scientific articles within educational sciences on fostering presentation skills are published in the following domains (top five): business (16), communication (8), medicine (6), multidisciplinary (6) and engineering (3). Thirdly, experts should have different backgrounds in terms of nationality regarding their working environment (university), since publications revealed that developing students' presentation skills is crucial in various parts of the globe (e.g. De Grez, 2009; Smith and Sodano, 2011; Young and Murphy, 2003). Previous studies on fostering presentation skills in higher education are conducted in the following countries (top five): United States (34), Australia (4), Belgium (4), Canada (3) and Hong Kong (2).

Context of the study

In the period 2014-2015, the first author in collaboration with one or more co-authors provided four interactive sessions in two national and two international conferences. The goal of these sessions was to test the validity of the rubric instrument for developing oral presentation skills by eliciting the perceptions of higher education experts towards the applicability of the instrument in educational practice.

Process

After presenting an introduction about crucial design principles of formative assessment for developing oral presentation competence in higher education (Van Ginkel *et al.*, 2015a), the rubric was individually tested by the attended participants of the session. The testing process consisted of listening to an introduction of the rubric instrument, watching a video of a bachelor student presenting her thesis and evaluating the student's presentation performance, by each expert individually, while adopting the constructed rubric instrument. After this exercise, of getting familiar with using the instrument, the majority of the session focused on the evaluation of the use of the instrument in formative assessment processes for developing presentation performance in higher education. Firstly, experts completed their evaluations about the rubric individually by completing a questionnaire (see *Instruments*). Secondly, the individual perceptions of the experts were collected and shared during the interactive part of the session. Finally, the data derived from both the questionnaires and the discussion sessions were gathered by the present authors who acted as session leaders.

Instruments

The instrument for evaluating the rubric concerned a questionnaire consisting of four propositions and for each of these propositions a box for additional remarks was added. These propositions corresponded to the findings of effectively constructing rubric instruments in higher education (Panadero and Jonsson, 2013; Reitmeier and Vrchota, 2009) and, therefore, contained the following topics: (1) the applicability of the rubric instrument in educational practice: (2) the completeness of criteria towards presentation performances; (3) the clarity in formulation of the levels relating to the criteria; (4) the usability of the scoring scales in formative assessment processes. In addition, these propositions could be scored on a five-point Likert scale, comparable to other recently constructed instruments within higher education measuring performances in formative assessment processes (Espasa and Meneses, 2010; Ferguson, 2011). The reliability coefficient of this questionnaire instrument revealed a reasonable score (Cronbach alpha: .616).

Data analysis

Since the goal of this study was to (1) elicit (individual) perceptions of higher education experts regarding propositions related to the rubric 'oral presentations skills' and to (2) discuss these findings among experts, both quantitative (i.e. questionnaires) and qualitative (i.e. open questions and interactive sessions) methods were used to gather and analyse the data. Firstly, for analysing the results of the scores on the propositions in the questionnaire, a quantitative analysis was necessary which consisted of calculating the means for each of the domains of expertise. An average of 4.0 was considered as 'valid', in accordance with comparable analyses in the context of presentation research within the field of higher education (Van Ginkel *et al*., 2015b). Furthermore, univariate analyses of variance were used to verify to what extent the evaluation of the experts differed between their domains of expertise. Secondly, for analysing the individual open remarks, related to the propositions, a qualitative analysis was needed. Since the goal of this qualitative analysis was to select only these suggestions for improvement of the rubric that received agreement from a significant proportion of the sample (the expert group), the 80/20 principle was adopted for this study. Without applying such principle, thus integrating all individual comments without common agreement from experts, both quality and validity of the rubric could decrease. The 80/20 principle has been successfully used in previous studies within higher education (e.g. Meijer *et al.*, 2013) and also in a recent study specifically focusing on deducing principles that foster oral presentation competence (Van Ginkel *et al.*, 2015a). Therefore, it was decided to integrate the most cited open remarks gathered via questionnaires (n=38), as strategies for improvement of the rubric, based on their presence in more than eight

(i.e., 20%) questionnaires. This twenty percent as minimum is based on the 80/20 principle referring to the norm that 80 percent of the results stem from a mere 20 percent of the efforts (Juran et al., 1974). Furthermore, the first author and one of the co-authors registered all comments during the four interactive sessions. Then, only these comments that were (1) discussed in the interactive part of the session and also (2) received agreement from the majority of experts in the particular session were formulated and presented in the result section.

Results

Considering this validation study, by using mixed methods, the results of evaluating the rubric by experts are reflected based on both a quantitative and qualitative analysis. Firstly, the results of the quantitative analysis are presented focusing on the mean scores of criteria for evaluating the rubric by the domains of expertise. Secondly, the qualitative analysis is reflected by focusing on the main issues for further developing the rubric regarding *content-related aspects* (i.e. criteria or scales) and *process-related aspects* (i.e. the adoption of the instrument in educational practice).   Firstly, the total means of all four identified criteria for evaluating the rubric revealed a positive and acceptable score, ranging from 3.79 to 4.11 (see *Table 1*). Although differences in scores existed between the domains of expertise towards several criteria, the results of a statistical analysis revealed that these differences between the domains of expertise were not significant: 1) Applicable in higher education ($F(3, 38) = 1.53$; $p = 0.22$); 2) Formulation of levels ($F(3, 38) = 0.48$; $p = 0.70$); 3) Completeness of criteria ($F(3, 38) = 0.17$; $p = 0.92$); 4) Usability of scales ($F(3, 38) = 2.21$; $p = 0.11$). Based on these findings, the authors concluded that, considering the averages of the mean scores on the adopted criteria for evaluating the rubric, higher education experts irrespective of their domain evaluate the instrument as 'acceptable'.

                                                   Secondly, based on the gathering and analyses of the qualitative data, derived from both the remarks in the questionnaires and discussions during the four interactive sessions, the following six suggestions for improvement of the rubric correspond to the requirements as described in the data analysis section and can be drawn as follows: *(1) content-related aspects of the rubric*: criteria c; (I) the main criteria for presenting are complete for assessing the performances, however, depending on the specific domain and situation or context of the presentation, certain criteria can be added (i.e.: questions of the audience, dress, presence and cultural adaptability); criteria b; (II) almost all levels are clearly formulated, however there is room for improvement, because some levels in the rubric are difficult for interpretation (i.e. terms like: 'regular', 'creative' or 'sometimes'); criteria d;

(III) the five-point scoring scale is considered as usable, however, adaptations of the scale could focus on (i) partial scores inline (so, including a '5' or '7' as possible categories and thus grades) and (ii) depending on the situation or context of the presentation, a weighing of scores for certain presentation criteria could be integrated into the instrument; *(2) process-related aspects of the rubric*: criteria a: (IV) training opportunities for teachers, tutors and students should be implemented in education that focus on the use of the rubric prior to feedback processes, because the rubric is complex and therefore, i.e., listening and using the instrument at the same moment for assessment purposes is difficult; (V) the rubric could be considered as complex regarding the amount of information, therefore structuring and combining criteria and sub-criteria that are related to each other are essential (i.e. by using visual aids – 'highlighting keywords' and grades 'from green to red' will facilitate the applicability of the instrument in practice); (VI) in formative assessment processes, only a selection of criteria could be used depending on the specific learning objectives of the particular student (i.e. by focusing on improving eye contact with the audience), this provides opportunities for giving feedback that focuses on certain criteria and facilitates the feedback process to be more effective for the learner.

[Insert Table 1 about here]

Conclusions and discussion

This study, using mixed methods, aimed to (1) design a rubric by identifying assessment instruments in previous presentation research and implementing essential design characteristics in a preliminary developed rubric and (2) testing the validity of the constructed instrument with an expert group of higher educational professionals. The output of this study is a validated rubric instrument for assessing oral presentation performance irrespective of domain, and consists of eleven presentation criteria, their related levels in performance and a five-point scoring scale. These adopted criteria correspond to the widely accepted main criteria for presentations, in both scientific literature and educational practice, regarding these aspects: the content of the presentation, structure of the presentation, interaction with the audience and presentation delivery. Besides the positive quantitative evaluation of the constructed rubric by higher education experts, the qualitative data also showed suggestions for improvement of the rubric regarding both *content-related aspects* as well as *process-related aspects*.

A critical note concerning this study is the lack of the student perspective while validating the constructed rubric 'oral

presentation skills'. Other perspectives relevant to the higher education context should be included via triangulation when testing the validity of the assessment instrument. First, teachers, with at least five years' experience in providing academic skills courses, should be selected, because of their specific expertise in both developing skills education as well as adopting assessment instruments in feedback processes. Second, students and tutors, defined as second- or third-year students, should test the validation of the rubric, because they fulfil essentials roles in providing and receiving feedback in peer feedback processes within various higher educational curricula. Third, alumni, defined as former students with at least a year experience in professional practice, should be adopted in validation sessions, since they can reflect on which specific presentation criteria are relevant in varying domains within the working environment. These insights should encourage researchers to critically reflect on which specific presentation criteria (and their related levels and scoring scales) are still relevant, since working environments are constantly changing and new technologies (i.e. virtual reality) are able to identify the validated presentation criteria (such as use of voice, posture, gesture and eye contact) and could also deliver immediate or delayed feedback on essential intermediate variables (such as nervousness) relating to the presenter. Therefore, testing the validity of the rubric, while using video footage with the rubric and triangulating different groups (i.e. teachers, students/tutors and alumni) within the higher education context, should be a core direction for future research in this specific field of research. Other limitations of this study relate to: the lack of focus on reliability concerns related to the rubric, like investigating the interrater reliability of the instrument and the lack of attention to the effectivity of the rubric instrument in feedback processes within presentation skills courses and its impact on the development of students' presentation performance.

Building on these limitations for providing directions for future research, the output of this study, the validated rubric 'oral presentation skills', (1) facilitates conducting (quasi-)experimental pre-test and post-test studies measuring students' presentation skills development, (2) encourages conducting research towards the use of rubrics from different feedback sources in feedback processes and (3) provides insights about how to test the validity of rubrics for assessing other academic and professional skills in the field of higher education. Firstly, a validated rubric allows researchers to measure the progress of students' presentation performance between a first and second presentation (e.g. Van Ginkel *et al.*, 2015b). Quasi-experimental studies could focus on the extent to which certain learning environments characteristics (i.e. the presentation task, types of feedback or the use of self-assessment tools) impact the development of students' oral presentation skills in a realistic

higher educational setting. Secondly, a validated rubric facilitates research towards the effective use of an assessment instrument in feedback processes. Future studies could focus on whether feedback sources (i.e. teachers, peers or peers guided by tutors) differentially use the rubric in providing and receiving feedback, since a previous study revealed that teachers outperformed peers and peers guided by tutors in terms of effects on presentation performances (Van Ginkel *et al.*, 2015b). Thirdly, future research could focus on applying insights from this study to testing the validity of rubrics for other academic or professional skills, like 'problem solving', 'negotiation skills' or 'argumentation skills' (Noroozi *et al.*, 2016). Previous studies emphasized the value of using rubrics in formative assessment processes (Jonsson and Svingby, 2007). However, within several courses focusing on 21st century skills, validated rubric instruments are lacking hitherto.   Findings deriving from these directions of future research could have consequences for future design of academic skills courses on the higher education level, since an effective use of rubrics by peers and tutors could decrease the pressure on teaching staff, since student numbers are rising, instructional time is decreasing and possibilities for teacher-student interactions are diminishing (e.g. Boud and Molloy, 2013; Chan, 2011; De Grez *et al.*, 2009b). Other studies (e.g. Murphy and Barry, 2016; Shute, 2008) recommended providing training to peers before entering feedback processes in higher education. Besides instructing students about how to deliver content-rich feedback while using rubrics, attention should also be devoted to group work dynamics when providing feedback on peer presentations. The goal is to guarantee that content-rich feedback is being delivered in a step-wise manner, in such a way that the feedback is clear enough for the feedback receiver to develop presentation performances (Shute, 2008).

These suggestions provide a more complete picture of what is needed in training sessions prior to the implementation of the instrument in actual formative assessment processes (Harran, 2011; Hodgson and Wong, 2011; Yalaki, 2010). These issues and recommendations should be incorporated to ensure that feedback processes adopting a validated rubric instrument are effective. This could be regarded as a challenge for both communities among researchers (scientific community) as well as educational practitioners (teachers, curriculum designers and students), and, therefore, these future studies could be valuable for researchers, teachers and curriculum designers active on the interface of designing formative assessment processes for academic skills provision within varying domains of the higher education curricula around the globe.

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[Insert Appendix about here]