

# DINNO<sup>®</sup>: An Innovative Technological Tool for Empowerment in Assessment

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**Abstract** This chapter introduces DINNO<sup>®</sup>, a technological tool for designing innovations in assessment, and presents the opinions on its usefulness and benefits of 60 university tutors who used the tool during a training programme. The DINNO<sup>®</sup> tool was developed in order to guide the decision making of university tutors when initiating a process of innovation in their assessment practice, so that they focus on the key aspects that educational research has shown to be relevant and innovative in the field of assessment. The tutors' opinions were collected through an online questionnaire and the results demonstrate the usefulness of this tool for planning innovation in assessment practice.

## 4.1 Introduction

To be enterprising requires a proactive attitude to life. Universities should encourage and enable this attitude by innovating in ways that promote active learning so that students cease to be passive subjects who “tolerate” their education and become active participants in learning. This implies helping students to take control of their learning process so they can continue to learn throughout their lives (OECD 2013). This chapter focuses on one single aspect of what universities engage in; the assessment of students and the innovation required in assessment practice.

When university tutors attempt to introduce innovation into their assessment practice they frequently face the difficulty of knowing precisely how to deliver true innovation in this area. This challenge often means that they resort to proposing innovations that result only in updating traditional practice but using new technological tools, whilst continuing to replicate the same, outmoded assessment strategies.

The incorporation of any technological element into assessment practice is automatically seen as an innovation, but is this really the case? Does simply incorporating some technological elements actually represent an innovation? The innovative nature of educational experiences can be analysed from multiple perspectives

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Carless (2011: 16). Considers it from the perspective of the end-user of innovation and says “I define innovation as an attempt to bring about educational improvement by doing something that is perceived by implementers as new or different. I use it interchangeably with the term change... (...) I use innovation from the point of an end-user. If formative assessment requires tutors to do things differently, then it is an innovation”.

From our perspective we believe that it is not enough just to do things differently. Innovation must be analysed from a dual approach: the essence and the context.

When we refer to the essence, that is, the fundamental nature of innovation, its permanent and invariable qualities, we mean to identify to what extent the nature of what is being proposed as an innovation, may actually be something truly innovative. Referring to the use of technology, the work of Healy et al. (2002) highlights that the use of a digital tool per se, does not automatically improve student learning. It is critical that appropriate design strategies are also employed to ensure that any digital tool used is pedagogically effective.

By contrast, when referring to the context, that is the environment in which innovation is implemented, we are focusing on the importance that the proposal or the proposed change has to the concrete and specific context. We must not forget that innovation must deliver added value to what was being done before. So, when considering any proposed innovation we should be clear about exactly what is the added value it delivers.

Problem Based Learning as a teaching strategy or the use of portfolios as a means of assessment lack an innovative character in themselves because they are strategies or methods that have been used for some time in the educational context. In this sense, simply using these teaching strategies or assessment instruments cannot be described as being innovative. However, if we resort to implementing these strategies or instruments in a university that has traditionally delivered its teaching through lectures or master classes, logically it would represent an innovative approach for that university. Thus, innovation can in some cases be achieved simply by the new implementation of a long-established and widely used strategy or instrument.

What is really needed is innovation *per se*; the added value that can provide a strategy, a means, a technique or an assessment tool. We must remember that an honest assessment of any new technology or of progress in general, requires a sensitivity to what is lost, as well as to what is gained. We must not allow the wonders of technology to make us blind us to the possibility that we may be diminishing the essential and relevant.

This chapter introduces *DINNO*<sup>®</sup>, a technological tool for designing innovations in assessment.<sup>1</sup> It has been developed<sup>2</sup> to guide university tutors when initiating a process of innovation in their assessment practice. Its aim is to facilitate the process of decision making about changes that need to be made, focusing on those essential aspects that research on assessment has shown to be the most relevant.

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<sup>1</sup><http://dinno.evalfor.net>

<sup>2</sup>Tool developed by the EVALfor Research Group (<http://evalfor.net>). Available in Spanish and English.

The aim of the chapter is to present the initial results of a study on the perceptions of university tutors on the use of innovative technological tools to support the planning and design of assessment in Higher Education. Firstly, it focuses on the concept referred to as “assessment as learning and empowerment” (Rodríguez-Gómez and Ibarra-Sáiz 2015) based on, among others, the contributions of Brown and Glasner (1999), Nicol and MacFarlane-Dick (2006), Carless (2007) and Boud and Associates (2010). Secondly, it describes the DINNO® programme, a technology based tool developed by the EVALfor Research Group to provide university tutors with ideas and options for introducing innovation into their assessment practice. Finally, it presents the initial results of the study focused on DINNO®’s usability.

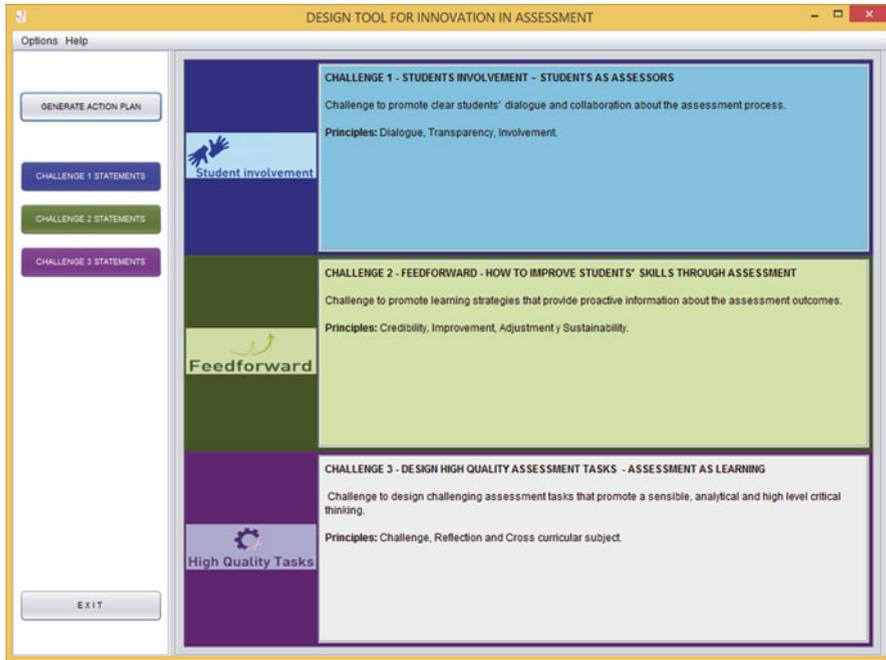
## 4.2 DINNO® Design Tool for Innovations in Assessment

DINNO® is an open source tool developed with the aim of guiding and facilitating university lecturers’ decisions when introducing innovations in assessment within their educational practice. The ultimate goal of this tool is to enable tutors to develop an Action Plan for Innovation in Assessment when they prepare their modules or teaching materials. DINNO® can be used both by individual tutors or by a team of tutors.

DINNO® is based conceptually within the framework of assessment as learning and empowerment (Rodríguez-Gómez and Ibarra-Sáiz 2015) (Ibarra Sáiz and Rodríguez-Gómez 2013a, b). Our understanding of this concept is as assessment that, within an academic context, facilitates the learning of students, giving priority to involving them in the assessment process, promoting strategies that provide proactive information to students on their progress and results and which is delivered through high quality tasks that require intellectual rigor, are relevant, meaningful, authentic, and provide support, guidance and direction to students so as to encourage self-regulation to acquire meaningful learning. Consequently, and in an extra-academic context, assessment as learning and empowerment involves learning throughout life; it enables the development of transferable skills that produce the capacity for self-determination in making personal and professional decisions based on an ecological, sustainable and socially responsible approach. In response to this, DINNO® is structured around three challenges:

- *Participation*. Students as evaluators.
- *Feedforward*. How to use assessment to improve students’ performance.
- *High Quality Tasks*. High quality assignments—assessment as learning.

Tutors can use DINNO® to develop their Action Plan. They can incorporate some or all of these challenges, whichever they consider to be priority areas, and subsequently modify or extend their Action Plan. The three challenges are based on ten guiding principles (Fig. 4.1) and are expressed through ten declarations or statements that guide the development of the Action Plan for Innovation in Assessment. Three statements relate to the challenge about student participation, four to the challenge of providing feedforward and three correspond to challenge related to designing high quality tasks. Or assignments



**Fig. 4.1** DINNO<sup>®</sup> Interface. Challenges and principles of assessment as a learning and empowerment

In order to guide the tutors, each statement consists of a brief explanation of what is considered to be good assessment, then poses a question about what students can do (Fig. 4.2) and finally introduces actions related to the statement.

For each of the ten statements a range of activities is suggested, 56 in all, from which tutors can select according to their priorities, to incorporate within their Action Plan. The challenges of student participation and high quality tasks are each divided into 17 potential actions and the challenge on feedforward into twenty actions. DINNO<sup>®</sup> allows tutors to select just one, several, or all of the actions presented as well as the possibility of including additional actions related to each statement (Figs. 4.3, 4.4 and 4.5).

Once tutors have prioritized the actions they plan to include in the assessment of their students' assignments, the DINNO<sup>®</sup> tool delivers their Action Plan in PDF, ODT or RTPF format (Fig. 4.6) that they can then share with other tutors or teams. Figure 4.7 offers an excerpt from an Action Plan drawn up by tutors.

On the DINNO<sup>®</sup> website (<http://dinno.evalfor.net>), in addition to the application itself to design the Action Plan, there are two short videos that contextualize the theoretical framework and introduce the Flashcards for *Principles and challenges of assessment for learning and empowerment in Higher Education* (Ibarra Sáiz et al. 2013)

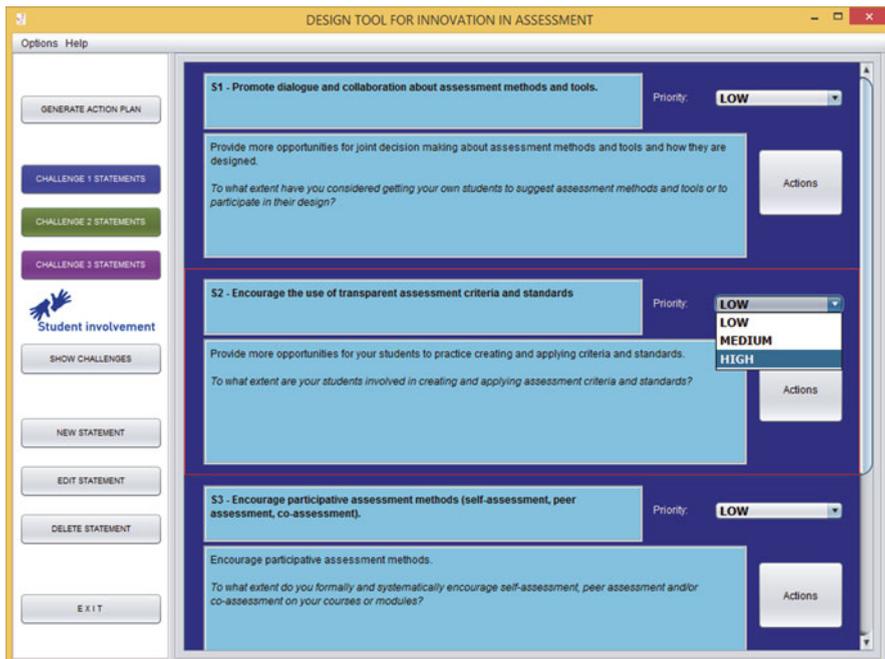


Fig. 4.2 DINNO® Interface. Statements relating to the challenge of student participation

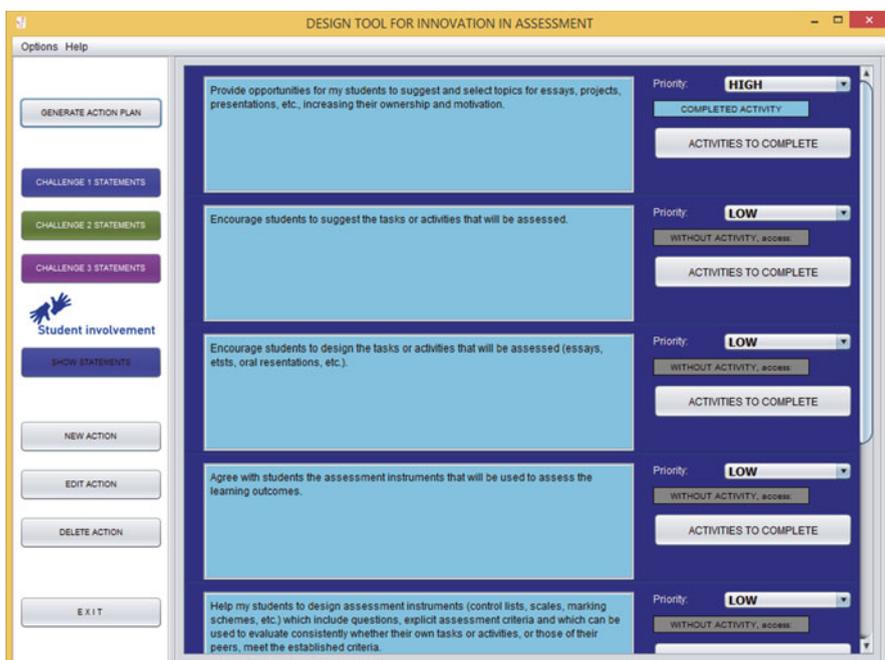


Fig. 4.3 DINNO® Interface. 5 actions relating to the statement *Promote dialogue and collaboration about assessment methods and tools*, as part of the challenge re student participation

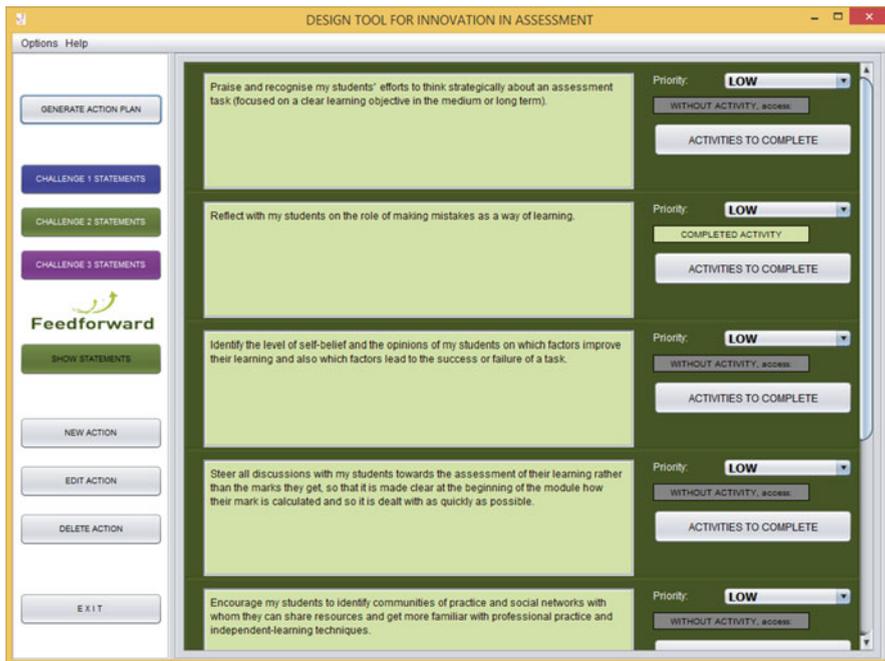


Fig. 4.4 DINNO® Interface. 5 actions relating to the statement *Trust in the students' ability to learn for themselves* for the challenge related to feedforward

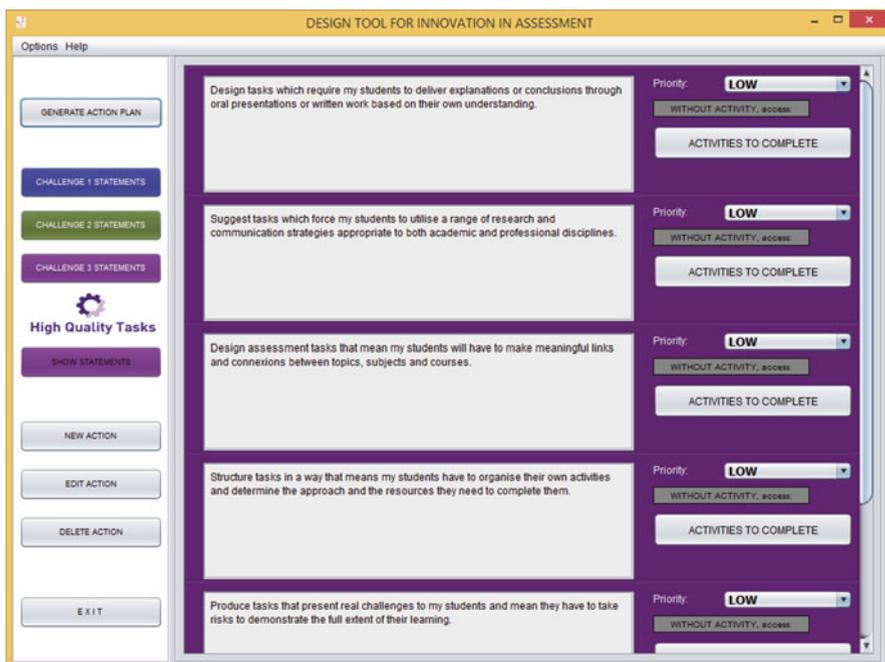


Fig. 4.5 DINNO® Interface. 5 actions relating to the statement *Design challenging assessment tasks* re the challenge about high quality tasks

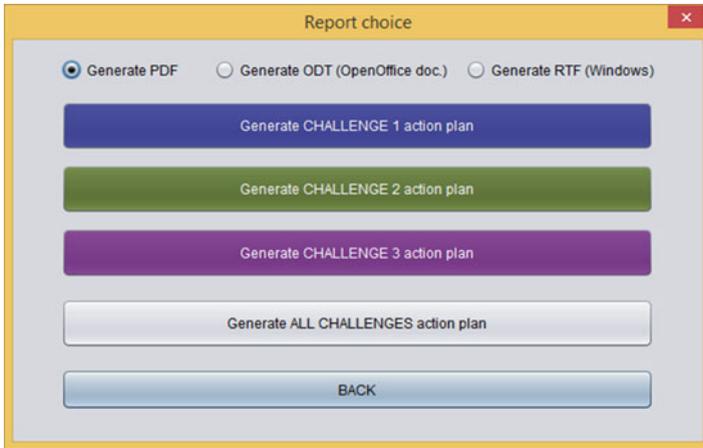


Fig. 4.6 DINNO® Interface. Generation of Action Plans

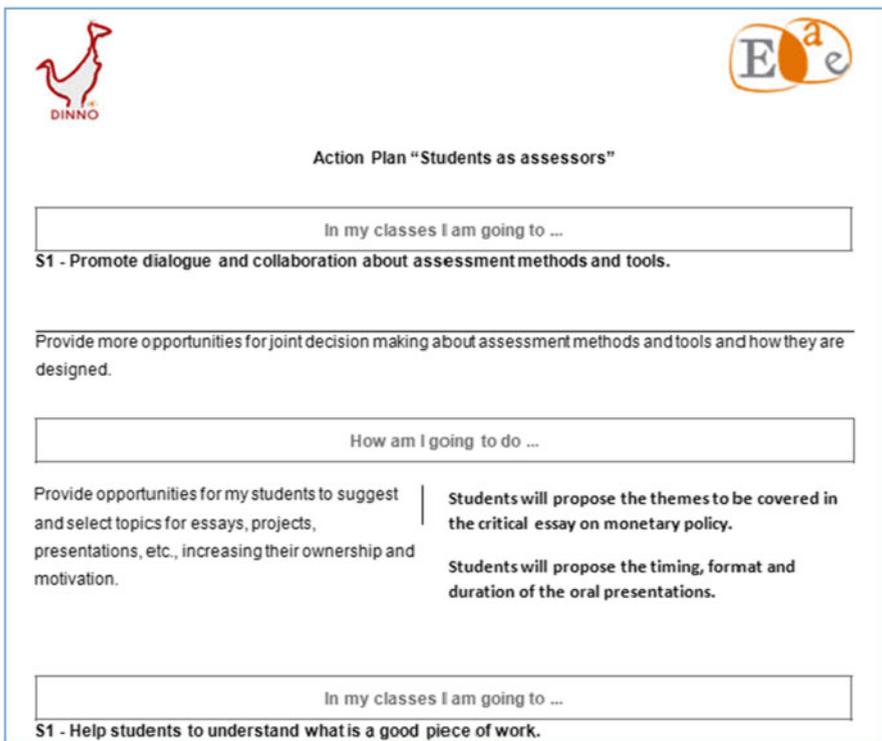


Fig. 4.7 PDF format sample extract from an Action Plan drawn up using DINNO®

### 4.3 Objectives

The aim of study was to obtain lecturers' responses to the following research questions:

- Do university lecturers believe the DINNO<sup>®</sup> tool is useful to them for their assessment practices?
- To what extent does the DINNO<sup>®</sup> tool help lecturers reflect on and plan innovations in their assessments?
- Do lecturers see the DINNO<sup>®</sup> tool as a resource that benefits their professional development?

### 4.4 Methodology

This study, based on a quasi-experimental single group posttest design, followed a survey methodology. During 2014 academics from various Latin American universities participated in various editions of the EVAPES-DevalSimWeb Training Programme that was primarily aimed at training tutors in assessment. In the context of this training programme they were presented with the DINNO<sup>®</sup> tool and they used it to design an Action Plan for innovation in their assessment practices. After using the tool 60 tutors responded to a specific questionnaire on the usefulness of DINNO<sup>®</sup>.

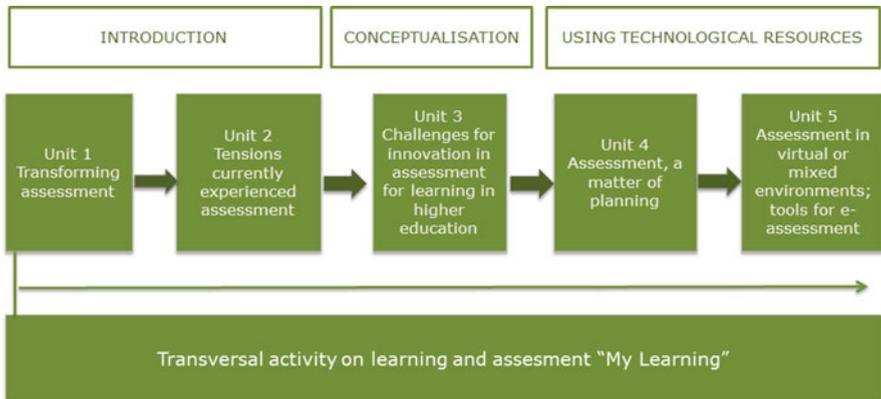
#### 4.4.1 *DINNO<sup>®</sup> in the EVAPES-DevalSimWeb Training Programme*

Training in the fundamentals and use of the DINNO<sup>®</sup> tool took place during the third training unit *The challenges of assessment for learning and empowerment in Higher Education* as part of the EVAPES-DevalSimWeb Training Programme *Assessment for Learning in Higher Education*.<sup>3</sup> The design, development, implementation and assessment of this training programme sought to address the following specific objectives:

- To promote the improvement and widespread use in universities of computer and web-based assessment tools developed in open source format, to encourage self-regulation and strategic learning that lead to improvements in the quality of higher education.
- To promote innovation in universities through changes in assessment models that promote skills development and continuous learning throughout the lives of their students.

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<sup>3</sup> DevalSimWeb Project- *Development of professional skills through participatory assessment and simulation using web-based tools*. Ref. ALFA III (2011)-10. Funded by the European Commission.



**Fig. 4.8** Organisation of the EVAPES-DevalSimWeb Training Programme

- To encourage the professional development of university tutors by increasing their level of competence so that they can address the assessment of student learning from a democratic and participatory perspective, using an approach that is based on self-regulation and strategic student learning and the use of open source LMS.

This training programme is accredited with 4 ECTS credits (100 h) and uses a blended learning strategy; virtual learning accounting for 80 h and physical class attendance 20 h.

Figure 4.8 illustrates the structure of the programme, divided into five training units and a transversal learning and assessment activity. The first two units introduce and foster reflection on assessment. The third unit focuses on conceptualizing assessment and on the challenges for innovation in higher education using the DINNO® tool. In the last two training units technological resources are used to design assessment procedures and to develop assessment tools that require the involvement of all concerned.

Within Unit 3, which focuses on the challenges of innovation in assessment for learning in higher education, DINNO® is specifically contextualized and used with the aim of developing an Action Plan for innovative assessment. Table 4.1 shows the contents of this unit. Training unit 3 entails 30 learning hours, virtual learning accounting for 22 h and class attendance 8 h.

#### 4.4.2 Research Sample

A total of 60 lecturers completed the online DINNO® Assessment Questionnaire. Table 4.2 shows the distribution of gender, the university of origin<sup>4</sup> and the subject or disciplinary area of the participants.

<sup>4</sup>Pontificia Universidad Católica de Ecuador—Sede Ibarra (PUCESI), Universidad de Costa Rica (UCR), Universidad Nacional Agraria de Nicaragua (UNA).

**Table 4.1** Contents of Unit 3 of the EVAPES-DevalSimWeb Training Programme

Unit 3	<i>The challenges of assessment for learning and empowerment in higher education</i>
	<ul style="list-style-type: none"> <li>• Assessment for learning and empowerment</li> <li>• The challenges of assessment for learning and empowerment <ul style="list-style-type: none"> <li>– The challenge of student participation. Students as assessors</li> <li>– The challenge of feedforward. How to improve students' performance through assessment</li> <li>– The challenge of creating high quality assessment tasks. Assessment as learning</li> </ul> </li> <li>• Innovation in assessment: the Action Plan as a prior stage to implementing assessment</li> </ul>

**Table 4.2** Sample distribution by gender, university and disciplinary field

	n	%
<b>Gender</b>		
Male	18	30.00
Female	42	70.00
<b>University</b>		
PUCESI (Ecuador)	26	43.33
UCR (Costa Rica)	27	45.00
UNA (Nicaragua)	7	11.67
<b>Disciplinary field</b>		
Art and Humanities	10	16.67
Pure Sciences	11	18.33
Health Sciences	10	16.67
Social Sciences	20	33.33
Engineering and Architecture	9	15.00

### 4.4.3 Instrument

After completing the training programme the tutors completed the DINNO<sup>®</sup> assessment questionnaire. This instrument consisted of eight Likert type questions with six levels of response (1 = Minimal; 6 = Maximum) and two open questions where tutors indicated the most positive aspects and those they felt that could be improved. In total, the tutors had to give their opinions on 28 questions about the tool.

The internal consistency of the online questionnaire was measured using Cronbach's Alpha statistic (0.98). The consistency of the tutors' responses was also determined by the use of two very similar questions, which produced a Weighted Kappa coefficient of 0.205 ( $p=0.007$  \*\*\*).

### 4.4.4 Data Analysis

The IBM-SPSS v22<sup>®</sup> software package was used to analyse the data. First, a descriptive analysis of measures of central tendency (Mean, Standard Deviation), reliability analysis and graphical analysis was completed. The Mann-Whitney U Test was

then used to identify the possible existence of differences in opinions depending on the subject area or discipline, the university of origin or gender of the respondent.

## 4.5 Results

### 4.5.1 Value Differences

No statistically significant differences ( $p < 0.05$ ) are found concerning the subject area of respondents. Differences are, however, found in relation to the university of origin and gender.

In the case of the university of origin differences are found only in a total of five items from the tutors of the University of Costa Rica (UCR) who indicate a lower overall score for the usefulness ( $M = 5.07$ ;  $SD = .91$ ) and clarity ( $M = 4.93$ ;  $SD = 0.87$ ) of DINNO®; its design appeal ( $M = 4.96$ ;  $SD = 1.01$ ), ease of use ( $M = 4.78$ ;  $SD = 1.21$ ) or whether it helped them to plan actions ( $M = 4.93$ ;  $SD = 1.10$ ), in comparison to the view held by tutors from the other two universities, who delivered scores in excess of 5 for each of these items.

The differences detected in the opinions of tutors analysed by gender are greater. In general, female respondents give higher scores to 57.14 % of the items, suggesting that women perceive greater value and benefits than men from using the DINNO® tool.

### 4.5.2 The Usefulness and Benefits of Using DINNO®

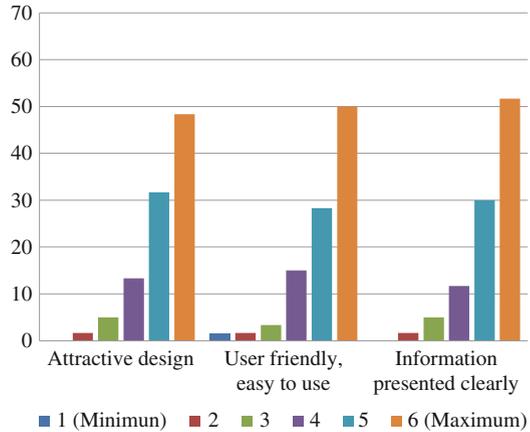
One of the essential characteristics for a technological tool to facilitate any work is its usability, meaning the extent to which it can be employed by specified users to achieve the objectives set out effectively, efficiently and satisfactorily within a specified context of use (ISO/IEC TR 25060: 2010).

Overall 87.34 % of the tutors say that they are satisfied with the use of DINNO®. The following sections present the results of asking the tutors about the design of the interface and the benefits and usefulness of the tool, both from an individual and an institutional perspective.

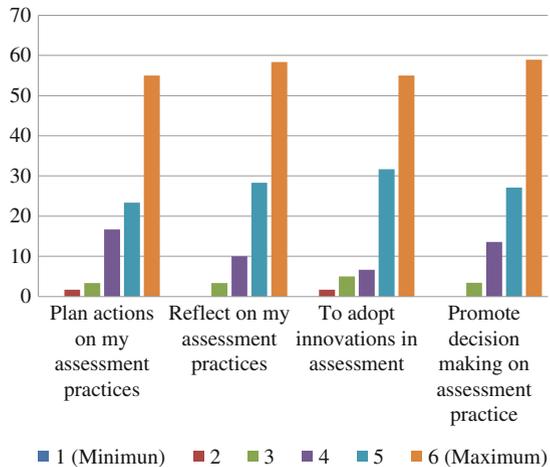
#### 4.5.2.1 Interface Design

We can see in Fig. 4.9 how the DINNO® tool has an attractive design for 80 % of tutors ( $M = 5.20$ ;  $SD = 0.97$ ), that it is friendly and easy to use according to 78.33 % ( $M = 5.17$ ;  $SD = 1.09$ ) and the information is presented in a clear and precise way in the opinion of 81.67 % ( $M = 5.25$ ;  $SD = 0.96$ ).

**Fig. 4.9** Design, user-friendliness and clarity of DINNO®



**Fig. 4.10** Rating for personal use of DINNO®



**4.5.2.2 Individual Usefulness for Assessment Practice**

Figure 4.10 presents the results obtained from asking the tutors about the use they have made of DINNO® from an individual and personal perspective. We can see how the most valued aspects (86.66 %) are that DINNO® helps them to reflect on their assessment practices ( $M=5.42$ ;  $SD=0.89$ ), has provided them with a structure to produce an Action Plan ( $M=5.34$ ;  $SD=0.84$ ), has provided them with an analysis of their actions to implement innovations in their assessment practices ( $M=5.33$ ;  $SD=0.93$ ) and allowed them to plan specific actions to take regarding their assessment practices ( $M=5.27$ ;  $SD=0.97$ ).

### 4.5.2.3 Help with Reflection and Planning

In Fig. 4.11, from a global, institutional perspective, we can see the results from asking tutors about the extent to which the DINNO® tool allows university lecturers generally to engage in certain activities relating to assessment in higher education. In this regard it is worth noting how the tutors indicate that the use of DINNO® fosters innovation in the process of assessment ( $M=5.50$ ;  $SD=0.81$ ), is useful when introducing innovations in assessment ( $M=5.48$ ;  $SD=0.85$ ), and serves to systematize planning ( $M=5.47$ ;  $SD=0.83$ ) and to reflect on assessment practice ( $M=5.45$ ;  $SD=0.81$ ).

### 4.5.2.4 Professional Development

When tutors were asked about the usefulness and benefits of DINNO® for the professional development of lecturers they also express a highly positive opinion (Fig. 4.12). In this sense, university tutors believe that using DINNO® in relation to their assessment practice improves their level of competence ( $M=5.43$ ;  $SD=0.83$ ); it facilitates the introduction of innovations in the process of assessment ( $M=5.42$ ;  $SD=0.85$ ); it can be used in university teaching ( $M=5.35$ ;  $SD=0.88$ ); it serves to encourage innovation in universities ( $M=5.48$ ;  $SD=0.74$ ) and according to 82.76 % it should be more widely used in higher education institutions ( $M=5.33$ ;  $SD=0.87$ ).

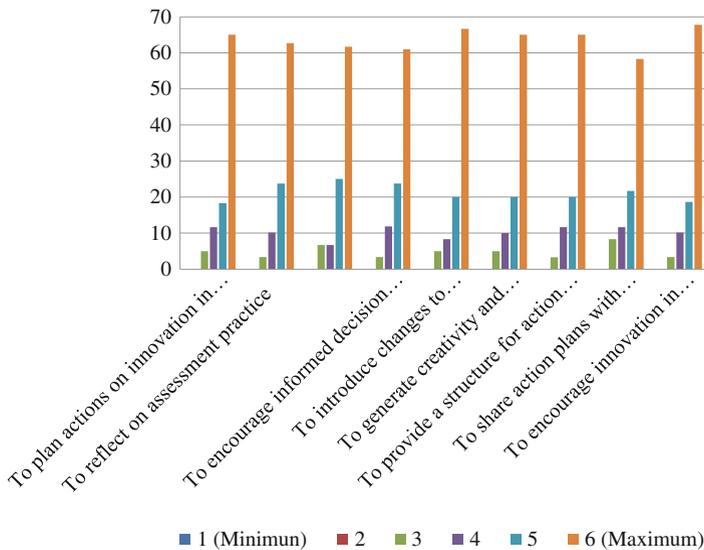


Fig. 4.11 Help with reflection and planning

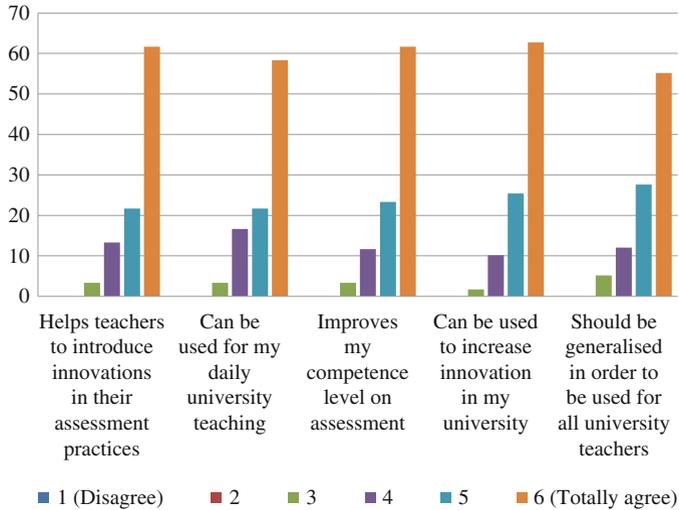


Fig. 4.12 Usefulness for the professional development of university tutors

## 4.6 Conclusion

According to the opinions of the university tutors who used the DINNO<sup>®</sup> tool it is user-friendly, has an attractive design, provides clear and detailed information, provides motivation and, consequently, is easy to use when considering assessment practice.

This study presents data which highlight the real possibilities and benefits of the DINNO<sup>®</sup> tool. In terms of its usefulness the majority of tutors feel that the tool helped them to reflect on their assessment practice and to plan developmental actions. Tutors also state that the use of DINNO<sup>®</sup> in Higher Education institutions would encourage and support the implementation of changes and innovations in assessment practice that would be beneficial both in terms of systematizing the assessment planning process and of reflecting on and analysing assessment practices whilst enhancing creativity and motivation to effect changes.

In relation to their professional development, tutors highlight in general that by using DINNO<sup>®</sup> they improve their assessment skills, can introduce innovations in their assessment process and that the tool is useful for driving innovation in universities.

Biggs (2015) maintains that it is necessary to introduce innovations in higher education in order to construct a coherent system in which student learning becomes the focal point. From the perspective of assessment this study has indicated where these innovations should be directed (Boud and Associates 2010; Brown 2015; Taras 2015) and, as Boud (2015) asserts, a new focus on assessment is needed in order to put the spotlight on the promotion of lifelong learning, which encourages

student participation in the assessment process, so that students are able to make judgments about their own learning process.

Based on the results obtained in this study, we believe that the DINNO® tool facilitates lecturers' analysis, reflection and decision making about assessment practice, due to its appealing design and easy usability. Its effectiveness results from providing choices and perspectives, offered in the form of the specific actions suggested for each of the various statements that make up every challenge. These choices and perspectives enable analysis of what is done and what can be done, opening the door to innovations in assessment which are oriented and focused towards developing a sustainable assessment process which empowers the students' learning processes. In this regard we believe that the DINNO® tool guides and facilitates decision-making to innovate in assessment because it is based on solid data regarding improving assessment practice. We consider that, in this case, DINNO® represents useful and innovative technology because it is contextualized and supports contemporary notions of assessment as learning and empowerment.

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