PebblePad

Talk the talk: Finding the language of the eportfolio

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Abstract

The design of eportfolios in Australian universities has traditionally been focussed in the social sciences and liberal arts, leading to a use of language within eportfolio systems that is specific to these fields. This enforced language can act to discourage students, and as a result staff, from alternative fields taking an eportfolio platform on board. This paper analyses what reflective language items are used in the field of engineering and how this differs from the language of other fields. We discuss how the issue of differing expectations may be resolved to effectively support student learning outcomes in an engineering course allowing eportfolios to be more readily introduced into a new program. It is concluded that the language of eportfolios must be adapted to suit the needs of the discipline.

Introduction

Reflection is understood to be central to the use of eportfolios (Riedinger, 2006). By providing a scaffolded opportunity for students to achieve higher order thinking skills, eportfolios can empower students to take responsibility for their own learning (Stefani, Mason & Pegler, 2007). PebblePad is no exception to this. Sutherland, Brotchie and Chesney (2011) state that PebblePad's "inbuilt reflective structure is what transforms PebblePad into a space where learning is generated rather than simply collected and evidenced" (p.24).

Specific reflective techniques are built directly into a number of the templates in PebblePad. These include a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis in the Action Plan and a reflection template that is What? So what? Now what? These reflections, however, are not generic. Rather, they come from particular fields: The SWOT analysis from the field of business and the So what? reflection from the field of education.

The ability to reflect has long been understood to be an important area of learning in professional fields (Schön, 1987). However, in engineering there tends to be a negative attitude towards writing in general and 'reflection' specifically (Faulkner & Azin, 2011). Engineering is frequently seen by students as a practical or real world skill. Writing, meanwhile, is seen as a school skill that does not have a practical application for the profession of engineering (Beer, 2002). Reflection is frequently seen as a pointless exercise. This can be seen in the feedback Faulkner and Azin (2011) received following the introduction of a reflective task, "I really don't see how writing a blog will make me an engineer" (p.13) and is telling of the problems many face in asking engineering students to reflect on their work.

Despite this opposition to reflection, within Engineering Australia (EA) Competencies (2011) graduating students must demonstrate that they are able to evaluate their own engineering and professional skills. In fact, reflection is addressed specifically as a skill that must be demonstrated in items 3.5a and 3.5e (Engineers Australia, 2011):

> 3.5a. Demonstrates commitment to critical self-review and performance evaluation against appropriate criteria

> 3.5e. Thinks critically and applies an appropriate balance of logic and intellectual criteria to analysis, judgment and decision making

The need to develop reflective skills and to record the progression of an engineering student's professional competencies make an eportfolio system an extremely useful tool to provide engineering students a way to gain an independent understanding of their skills and professional development. However, the success of introducing an eportfolio system for this use hinges on student acceptance of it. To implement an eportfolio system in an engineering department, it is important to understand why so many engineering students dismiss the idea of reflection and look for a solution to this dilemma.

Method

ePortfolios were introduced to 177 first year engineering students at an Australian university as a way for students to improve their writing, presentation, and employability skills. Students were asked to use PebblePad to create a three-page webfolio. The first page was to be used for students to introduce themselves and the webfolio. The second page asked the students to present evidence of completion of their Practical Project, which was a group work task completed during the semester. The final page required students to demonstrate Evidence of Skills Developed. To complete this final page, students were asked to provide evidence of team work, and consideration of safety, ethics, and sustainability throughout the semester. Being able to demonstrate each of these skills is a requirement for the Professional Competencies for Australian Engineers (EA, 2011).

The students' webfolios were assessed using a feedback template (Appendix 1), marked on the following criteria: Practical Project documentation; Evidence of skills developed - sustainability, safety, ethics, teamwork; Writing and proofreading; and Presentation. Each criterion was given a mark out of five, with marks being combined to give a final mark out of twenty. There was space for a comment for each criterion and an additional space was provided for general feedback. The assessment was marked by communication laboratory tutors using the feedback template within ATLAS.

After ensuring the anonymity of the students and tutors, a text analysis was run on the language provided by the tutors on the completed feedback sheets to determine to what extent reflection was expected to have been produced by the students. Using a list of action verbs devised from Bloom's Taxonomy of Learning (Clemson University, 2013), reflective language items were identified within each of Bloom's progressively complex cognitive domains: knowledge, comprehension, application, analysis, synthesis and evaluation. To ensure that all formations of the word were included in the analysis, the reflective language items were searched according to their word stems (see Appendix 2). The word 'reflect' was not listed in the Clemson University list of verbs. For the purpose of this study, reflection is assumed to sit at the highest of Bloom's thinking skill level of 'evaluation'. The word stem 'assess' was removed to avoid possible confusion with the idea of 'assessment task'. When 'critical' appeared alongside the word 'reflection' it was removed, to prevent doubling up of results. (Appendix 2).

To compare the reflective language used by the university tutors with that of Engineers Australia, the text of EA Professional Competencies (2011) was analysed for the same language items. In order to examine what differences there might be between the expectations of graduating engineers and a different profession, the language of the Western Australian Department of Education and Training (WA DET) (2004) Competency Framework for Teachers was also analysed.

Results

In the webfolio feedback provided by the tutors, reflective language items accounted for 1.464% of words used. The largest number of reflective language words that were used were found in the lowest of the thinking order skills from Bloom's Taxonomy of Learning: Knowledge. Words requiring reflective processes that were most frequently used from this list were 'describe' (0.368%), 'discuss' (0.654%) and, from the comprehension skill, 'explain' (0.193%). Words from the knowledge skill accounted for 1.0588% of the words used in the feedback (see Graph 1).

The tutor feedback for the first year ePortfolios used fewer reflective language items than both of the two professional competency documents: the Engineering Professional Competencies (Engineers Australia, 2011) and the Western Australian Competency framework for teachers (WA DET, 2004). These two competency documents used a very similar percentage of reflective language items, with reflective terms accounting for 2.852% of the EA Competencies vocabulary

items and 2.784% of the Teaching Competency Framework vocabulary items. In both competency documents, the greatest number of reflective terms was found to be in the highest thinking skill of evaluation (see Figure 1).

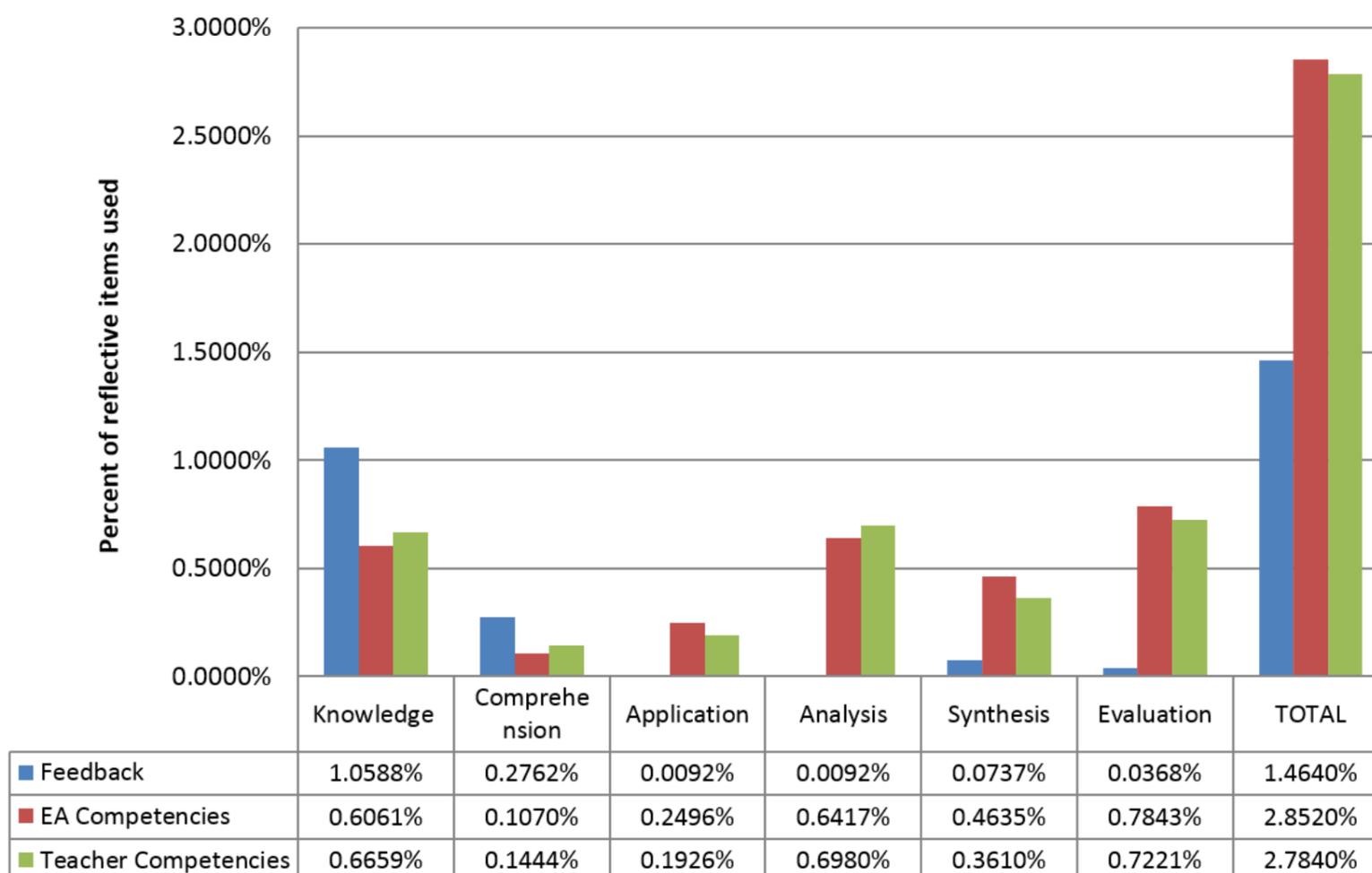## Use of reflective language items (within Bloom's Taxonomy)

	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	TOTAL
■ Feedback	1.0588%	0.2762%	0.0092%	0.0092%	0.0737%	0.0368%	1.4640%
■ EA Competencies	0.6061%	0.1070%	0.2496%	0.6417%	0.4635%	0.7843%	2.8520%
■ Teacher Competencies	0.6659%	0.1444%	0.1926%	0.6980%	0.3610%	0.7221%	2.7840%

Figure 1: Percentage of reflective words used in eportfolio feedback, Engineers Australia (2011) engineering competencies, WA Department of Education (2004) teaching competencies

Individual language items that were frequently used by Engineers Australia (2011) are analyse (0.428%), plan (0.321%) and evaluate (0.214%). The words that were most frequently used by the WA Department of Education (2004) were relate (0.225%) critical (when used independently from the item 'reflect') (0.538%), plan (0.361%) and reflect (0.281%). Two language items appear in only one of the competency documents: 'Justify', which accounts for 0.178% of the words in the EA competency and 'reflect', which accounts for 0.281% of the words in the WA DET competency (see Table 1). In Figure 2, the term 'reflect' is excluded from Bloom's taxonomy and treated as an independent item.

Table 1: Most commonly used reflective words in the eportfolio feedback, EA (2011) competencies, WA DET (2004) competencies. Items appearing over 0.20% of the time appear in bold.

Term	Bloom	ePort Feedback %	EA Comp %	Teacher Comp %
descr*	K	0.368	0.107	0.265
discus*	K	0.654	0.036	0.040
identi*	K	0.009	0.428	0.233
expla*	C	0.193	0	0.040
analy*	A	0.009	0.428	0.128
critical*	A	0	0.214	0.538
plan*	S	0.073	0.321	0.361
Assess	E	0.147	0.214	0.682
evaluat*	E	0	0.214	0.096
interpret*	E	0	0.178	0.048
justif*	E	0	0.178	0
relat*	E	0.037	0.143	0.225
reflect*	N/A	0	0	0.281
Conclusion questions	26.7	26.7	40	6.7
Final report	0	0	73.3	26.7
Attachments	0	21.4	42.9	35.7

Percent of reflective words used 'reflect' as single item
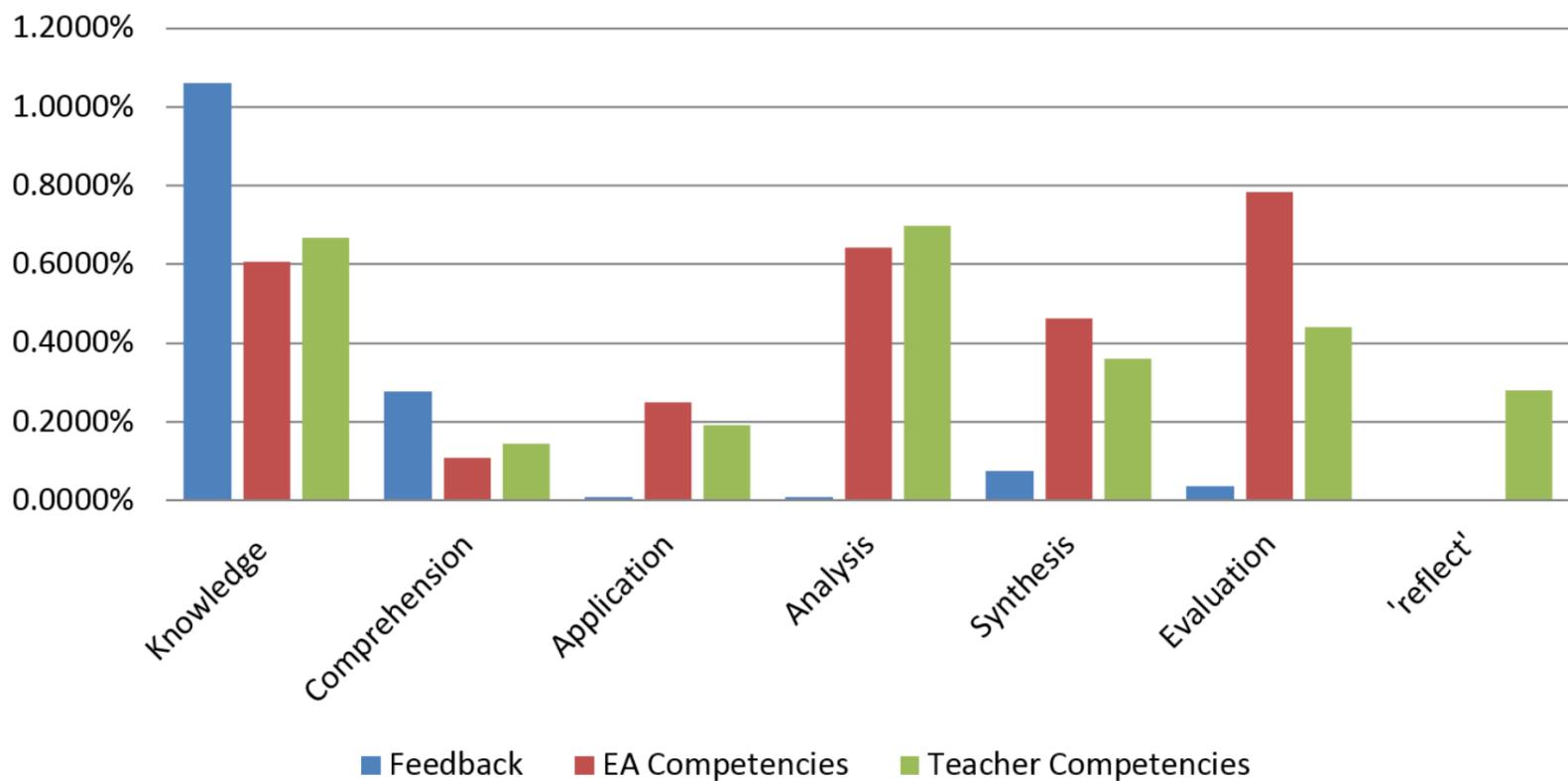
Figure 2: Per cent of reflective words used in ePortfolio feedback, Engineers Australia (2011) engineering competencies, WA Department of Education (2004) with the word 'reflect' treated as an individual item

Discussion

The analysis of the EA Competency document and the WA DET Competency Framework reveals that at the graduate level, the reflective skills required of engineering and education students are comparable. However, many of the language items that are used to express this skill differ. It is interesting that two of these words are not represented at all in the alternate competency: justify and reflect. Given the importance of the word 'reflect' in the use of eportfolios, its absence in both the EA competency and the ePortfolio Feedback is particularly noteworthy. This is demonstrated in Figure 2, where the single item 'reflect' is treated separately.

The reflective language used by the tutors is interesting in that it is provided at a much lower level than the two competency documents. To some extent, this is to be expected for feedback that is provided to first year students' work, as students are still learning engineering principles. However, it also reveals a need for staff to be aware of what the reflective requirements are for students to achieve professional engineering competencies. Students should be explicitly taught how to reflect appropriately in the field of engineering with increasing complexity throughout an engineering course. Specifically, students should be taught how to i*dentify, analyse, plan, assess* and *evaluate* in the context of engineering. By using these terms explicitly in the phrasing of the assessment task and on the feedback template, students can be guided through this process. Making these reflective expectations clear would further support communication tutors in marking student work.

Conclusion

An eportfolio is undoubtedly a useful tool to assist engineering students throughout their studies as they aim to meet the competency requirements of their field. However, it is important that the language of the profession is used. By replacing language from alternate fields that may lead to resistance from students, such as reflect, with language that is required within their field, students can take ownership of their learning and achievements. It is only once students recognise that the eportfolio system links directly to their future profession that it will be accepted as a valuable part of their studies.

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Appendix1: Sample of feedback sheet provided to students.

ePortfolio Feedback

The main aim of this ePortfolio is to show that you have reflected on your learning over the semester in the context of your future career.

ePorfolio objectives:

List objectives here

ePortfolio components

In this ePortfolio you must include the following pages:
– Portfolio introduction
– Practical project documentation – with evidence
– Evidence of skills developed – with evidence

Practical Project documentation

How clearly did you communicate the project task and your design solution—both your description of how it works and how well it performed during the competition?
How well did you link the unit concepts to the project process?

Elements:
1. Solution description
2. Plan/photo/video
3. Link between project and unit topics

insufficient   0   1   2   3   4   5   excellent
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Comments

A photo of your vehicle would have been good here. You need to openly show the links between the project and unit topics.

Evidence of skills developed

How well did you explain the evidence of skills you developed for each project?
How clearly did you link these skills to the learning outcomes specified?
How well did you explain these ideas in terms of your professional growth?

Elements:
1. Evidence of sustainable design
2. Evidence of safety and/or ethics in design
3. Evidence of teamwork

insufficient   0   1   2   3   4   5   excellent
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Comments

This is not detailed enough to adequately cover the requirements of the rubric.

Writing and proofreading

How well did you express your ideas?
Is the style of your writing appropriate to the task?
Did you use specific enough vocabulary and clear sentence structure?
Is your writing free from grammatical errors, and is spelling and punctuation correct?

insufficient   0   1   2   3   4   5   excellent
〇〇〇〇◎〇

Comments

Well done.

Presentation

How thoughtfully did you structure your e-portfolio? Is it easy to read and navigate?
Did you use graphics/ multimedia wisely?
How well did you organise your descriptions?
Does each one have a topic sentence, and is it easy to follow?
Have you communicated the ideas to the audience clearly and made it interesting?
Is it appropriate for a professional audience?

insufficient   0   1   2   3   4   5   excellent
〇〇〇〇◎〇

Comments

Love the lay out. very striking. More photos would break up the text.

Total mark

14

General comments

You have developed the overall presentation well. Just make sure you put in the written requirements.

Please use this link to view the **full grade descriptions**.

Appendix 2: Blooms Taxonomy assessment

Language item	ENG Feedback		EA Comp		Teacher Comp	
	Times used	%	Times used	%	Times used	%
Blooms Taxonomy: Level 1 - Knowledge						
descr*	40	0.3682902	3	0.106951872	33	0.264762516
discus*	71	0.6537151	1	0.035650624	5	0.040115533
identi*	1	0.0092073	12	0.427807487	29	0.23267009
outlin*	3	0.0276218	0	0	7	0.056161746
recogni*	0	0	1	0.035650624	9	0.072207959
Total	115	1.0588344	17	0.606060606	83	0.665917843
Blooms Taxonomy: Level 2 - Comprehension						
demonstr*	0	0	0	0	0	0
disting*	0	0	0	0	0	0
expla*	21	0.1933524	0	0	5	0.040115533
Express	5	0.0460363	2	0.071301248	1	0.008023107
Extend	0	0	0	0	2	0.016046213
review*	4	0.0368290	1	0.035650624	10	0.080231065
summar*	0	0	0	0	0	0
Total	30	0.2762177	3	0.106951872	18	0.144415918
Blooms Taxonomy: Level 3 - Application						
apply*	0	0	1	0.035650624	18	0.144415918
predict*	0	0	2	0.071301248	0	0
solv*	1	0.0092073	4	0.142602496	6	0.048138639
Total	1	0.0092073	7	0.249554367	24	0.192554557
Blooms Taxonomy: Level 4 - Analysis						
analy*	1	0.0092073	12	0.427807487	16	0.128369705
critical*	0	0	6	0.213903743	67	0.537548139
differenti*	0	0	0	0	0	0
illustr*	0	0	0	0	0	0
infer*	0	0	0	0	0	0

question*	0	0	0	0	4	0.032092426
Total	1	0.0092073	18	0.64171123	168	0.69801027

Blooms Taxonomy: Level 5 - Synthesis

plan*	8	0.0736580	9	0.320855615	45	0.361039795
synthesi*	0	0	4	0.142602496	0	0
Total	8	0.0736580	13	0.463458111	45	0.361039795

Blooms Taxonomy: Level 6 - Evaluate

apprais*	0	0	1	0.035650624	0	0
Assess	16	0.1473161	6	0.213903743	85	0.681964056
evaluat*	0	0	6	0.213903743	12	0.096277279
interpret*	0	0	5	0.178253119	6	0.048138639
judg*	0	0	1	0.035650624	9	0.072207959
justif*	0	0	5	0.178253119	0	0
relat*	4	0.0368290	4	0.142602496	28	0.224646983
Total	4	0.0368290	22	0.784313725	55	0.44127086

Other

reflect*	0	0	0	0	35	0.280808729

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[1] The language item 'critical' was not counted if it appeared in conjunction with the word 'reflect'. When counted as an individual item, it was used 81 times (0.64987163% of words used) within the Teaching Competency document