Reconceptualising teaching portfolios for professional development in engineering education

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A teaching portfolio is a collection of texts and materials that are intended to represent teaching practice. Many institutions require candidates applying for tenure, ad hominem promotion, or teaching excellence awards to submit a teaching portfolio as part of their application. Building a teaching portfolio engages candidates in reflection on their practice and has been shown to enhance teaching practice. However, less is known about how the socio-cultural contexts of different disciplines and fields shape the representation of candidates' teaching practice. To address this gap with regard to engineering education, the teaching portfolios of engineering lecturers applying for tenure, promotion, and awards at four different universities were studied, guided by the research question: How does the social context of a teaching portfolio impact the representation of teaching practice? The study found that the social context strongly influenced representations of practice. In the portfolios submitted for tenure or promotion, candidates obscured their teaching practice and instead foregrounded departmental goals or other official documents. In contrast, the award applicants provided detailed, reflective descriptions of their practice. These findings have implications for how engineering educators could be holistically supported towards enhancing their teaching practice, and its representation, in developing portfolios for tenure, promotion or awards.

Keywords: teaching portfolios, tenure; promotion, teaching awards, Activity theory

Introduction

Many South African and international universities require academic staff to submit teaching portfolios when applying for tenure, promotion or teaching excellence awards. In the South African context, most permanent academic appointments are subject to a one-year probation period, after which the incumbent is granted tenure, that is, their permanent appointment is confirmed. Many universities require the submission of a teaching portfolio towards the end of the probation period as a condition of tenure. Teaching portfolios are thus important artefacts that have come to symbolise transitions in an academic career, as well transformations in

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teaching practice. Teaching portfolios traditionally provide evidence of an educator's growth, competence, or attainment of excellence. Despite the growing use of teaching portfolios in higher education, little attention has been paid to understanding their genre within different disciplines and fields. The focus of this paper is a reconceptualisation of teaching portfolios, arguing their roles as both regulating and enhancing teaching practice in engineering education.

Data for the study was obtained from engineering educators' teaching portfolios submitted for tenure, promotion, or teaching awards. The research design draws on the research tradition around technologically-mediated communication in workplace settings (e.g., Kaptelinin & Nardi, 2006). A modelling methodology for representing knowledge work (Zachry et al., 2008) was adapted for the analysis of portfolio data. This approach understands portfolio-building as connecting chains of coordinated communication events to form a 'genre ecology' (Spinuzzi, 2002). These communication chains become the primary unit of analysis as they are representations of teaching tasks, decision points, actors, documents, or combinations of these. While much is known about the role of reflective practice in professional development towards enhancing teaching, less is known about the teaching portfolio as an artefact in a professional educational system. The study provides a framework towards reconceptualising teaching portfolios in engineering educators' career trajectories.

An additional focus of this paper is teaching portfolios developed by novice and experienced engineering educators across four universities, with a view to clarifying differences in representations of teaching practice in the teaching portfolios that are submitted at different stages in an academic career. The research question guiding this research study is: how does the social context of a teaching portfolio impact the representation of teaching practice? The assessment of a tenure or promotion teaching portfolio submission is likely to be undertaken by a departmental or faculty review committee, to which a teaching and learning expert might be invited, while the assessment of an teaching award portfolio is likely to be led by a teaching expert. The four universities are based in the Western Cape, South Africa. Three have engineering faculties and, although one has no engineering faculty, it does have engineering-related programmes and employs engineers as educators. The fields of engineering are dissimilar to the discipline of education, and stages in the growth of educational competence or the development of an educational identity are more easily identified in such disciplines (Michelsen et al., 2017).

A brief overview on the literature on teaching portfolios

Traditionally, a teaching portfolio is defined as 'a collection of materials that documents teaching performance [and] brings together in one place information about a professor's most significant teaching strengths and accomplishments' (Seldin, 2000, p. 36). Teaching portfolios were introduced into higher education in the 1990s, following a renewed interest in the role of teaching brought about by Boyer's (1990) concept of the scholarship of teaching and Schön's (1992) foregrounding of reflective practice in professional education. Seldin, echoing Boyer, claims that 'the portfolio is to teaching what lists of publications, grants, and honors are to research scholarship' (2000, p. 37). Schönwetter et al. claim that teaching portfolios turn university lecturers into 'reflective practitioners' (2002, p. 86). Teaching portfolios in higher education have a historical context. Their usage is linked to increases in student numbers, growth in student diversity, and the realisation by university managers that good teaching matters.

Early approaches to teaching portfolios recommended that practitioners should tell their 'stories', while acknowledging the complexity of most academics' stories. Over time, the teaching portfolio started to take shape as a genre, comprising a 'teaching philosophy statement', a description of the teaching context, descriptions of practice, and reflections on practice, usually supported by an appendices of evidence (Pelger & Larsson, 2018). From the outset, researchers pointed out the complexity of the genre; it was personal, but also expressed disciplinary and departmental cultures and concerns, and addressed various audiences: 'Each teaching philosophy statement reflects not only personal beliefs about teaching and learning, but also disciplinary cultures, institutional structures and cultures, and stakeholder expectations' (Schönwetter et al. 2002, p. 83).

A teaching portfolio is personal because it reveals the philosophy, accomplishments, reflections, plans and 'inevitably the personality of its author' (Graves & Epstein, 2011). The genre of a teaching portfolio is difficult to pin down because it intermingles 'cognitive, motivational, personal, and impersonal processes' in an attempt to describe the complexities of higher education teaching (Forsyth, 2016).

While the original intention of teaching portfolios was to encourage academics to share and reflect on their teaching, thereby enhancing their practice (Seldin, 2000; Schönwetter et al. 2002), teaching portfolios were soon used by managers as a way of holding academics

accountable for the quality of their teaching. Teaching portfolios thus became a way of providing managers 'with useful information in promotion/tenure decisions' (Seldin, 2000, p. 37). Unsurprisingly, teaching portfolios have not met with unanimous approval in higher education. Nevertheless, many universities have adopted the practice of requiring teaching portfolios for tenure or promotion and for teaching excellence awards. The discovery of teaching portfolios by managers tended to reshape the original narrative genre towards a form that took a more systematic approach to the measurement of teaching achievements (Kim & Kim, 2018), based on more explicit definitions of 'pedagogical competence' (Olsson & Roxå, 2013). The assessment of portfolios, and issues around credentialing, accreditation, standards of validity, reliability, fairness, and the absence of bias thus became central concerns (Kim & Yazdian, 2014). When portfolios are submitted for purposes of tenure or promotion, it 'reminds professors to monitor, measure, and even manipulate those processes' that are likely to ensure a successful outcome (Forsyth, 2016, p. 273). Portfolios can thus be used not only to enhance teaching practice, but to craft a particular teaching persona (e.g., Graves & Epstein, 2011).

Not all teaching portfolios are the same (Babin et al., 2002). Although the rationale for teaching portfolios is to encourage reflective practice (Seldin et al., 2010), differing views on their purposes have led to their adoption for different reasons. For example, teaching portfolios have been used to assess a candidate's readiness for tenure, and teaching portfolios are also a means for engaging in the scholarship of teaching and learning. These different uses of portfolios are based on paradigms that are philosophically incompatible, and thus contradictions are likely to arise in how teaching practice is represented (Leggett & Bunker, 2006).

Portfolios have been researched from a variety of perspectives. In the case of professional education, researchers have been interested in teaching portfolios as means of linking theory and practice in the education of future professionals (Boud & Brew, 2013), and resolving the tensions between professional and teaching identities (Graves & Epstein, 2011). Zhou et al. (2017) found that teaching portfolios were an effective means of enhancing new academics' teaching towards their becoming reflective practitioners. Kaasilia et al. similarly found that a reflexive approach to teaching portfolios did not cause fractured identities, but facilitated 'the development of more holistic, relational identities' amongst educators in professional fields (2021, p. 584). The literature on the assessment of professional practice (e.g., Boud & Brew, 2013) points to the importance of formative feedback for professional growth. Teaching

portfolios can provide contexts for peer review, coaching and mentoring in which teachers support their own and others' practice through portfolio building. For example, Harvard University's Best Foot Forward programme uses video-based teaching portfolios to improve classroom practice through peer review (Quinn et al., 2015).

Up until the 1990s portfolios were mainly paper-based. However, with the development of information and communication technologies, a transition towards the use of electronic portfolios (e-portfolios) that incorporate a wide variety of media occurred. While definitions of e-portfolios vary, a much-cited definition is: '…a digitized collection of artefacts, including demonstrations, resources, and accomplishments that represent an individual, group, community, organization or institution. This collection can be comprised of text-based, graphic, or multimedia elements archived on a web site or other electronic media' (Lorenzo & Ittelson, 2005, p. 3.

It has been noted that the transition to e-portfolios enables meaningful technology integration in educational development (Fong et al., 2014). The digitised nature of e-portfolios means they are more easily modified and can be regularly updated. E-portfolios are also more sharable, on institutional or personal websites, or on social media. While portfolio authoring tools have changed over the years from paper to electronic or web-based formats, they remain complex and difficult texts in terms of their social contexts and the development of an appropriate authorial voice (Torras & Mayordomo, 2011). E-portfolios need to have multiple affordances: the needs of presentation (e.g., a website affordance), as well as the process aspects of portfolio-building, such as artefact storage, sharing and collaborating, journaling, blogging, and so on: '[An e-portfolio] is the powerful intersection of multiple modes of performance that establishes the e-portfolio medium as an elastic, ultra-accessible theatrical arena in which academics may create, rehearse, and present themselves' (Ramirez, 2011, p. 1). The e-portfolio literature highlights the tensions between structured (and sometimes overly rigid) templates and more flexible constructions that allow greater creativity and innovation.

Seldin argues that a teaching portfolio is 'flexible enough to be used for tenure and promotion decisions or to provide the stimulus and structure for self-reflection about teaching areas in need of improvement' (Seldin, 2000, p. 36). The issue that this study addresses is whether the genre of the teaching portfolio is flexible enough to accommodate the socio-cultural contexts of engineering education.

Theoretical framework

In order to explore the wider socio-cultural context in the development of teaching portfolios, the study drew on the resources of Activity Theory (Engeström, 1987; 1999). Activity Theory understands that human activity is always undertaken by subjects, mediated by tools, and embedded within a social context. The interactions between subject, object, tools, and social context is known as the 'activity system' (Figure 1).
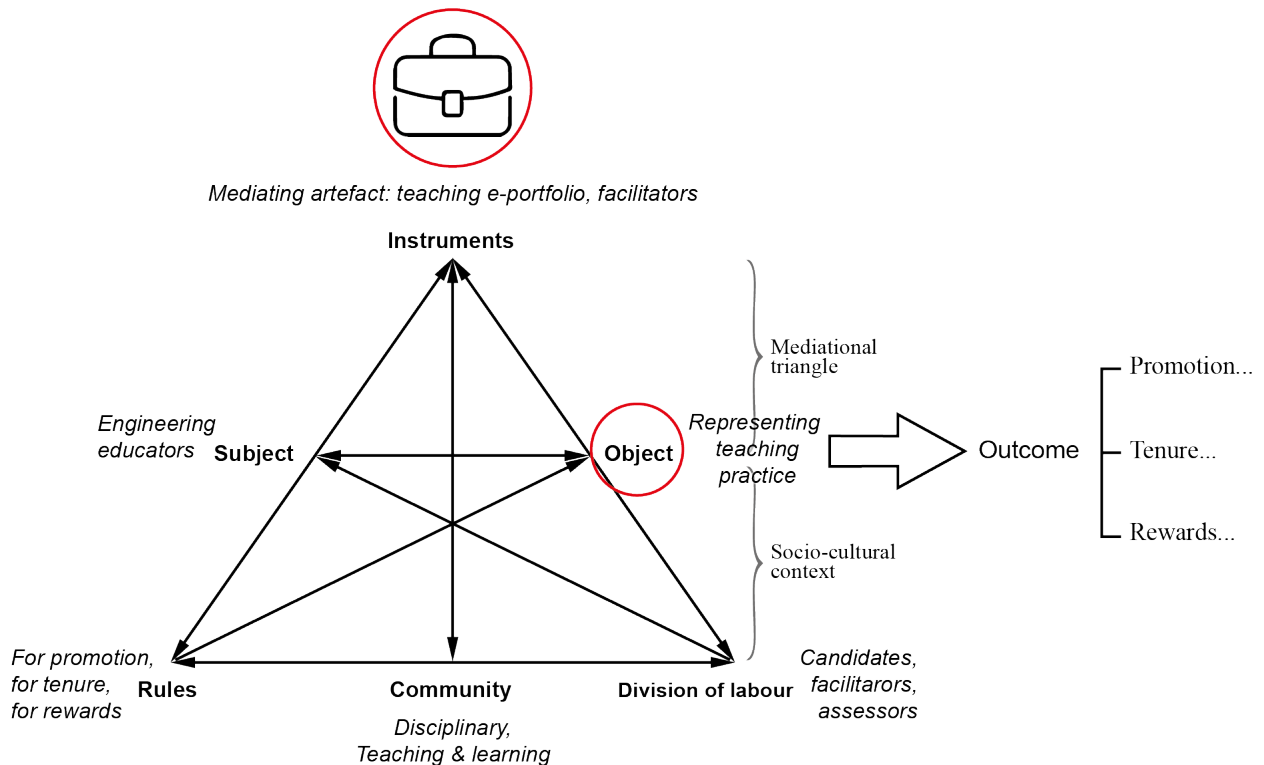

Mediating artefact: teaching e-portfolio, facilitators

Figure 1: *The activity system of demonstrating teaching practice*

Source: Adapted from Engeström (1999)

The elements of the activity system comprise: the subjects – in this case engineering educators involved in the activity of explaining their teaching practice; mediating artefacts and persons – in this case the teaching e-portfolio and the academic development facilitators; and the object, goal or driving force of the activity – in this case describing and reflecting on and representing teaching practice. These first three elements of the activity system (the 'mediational triangle') are embedded in a socio-cultural context that includes: the rules, conventions and guidelines (of which there are many to take into consideration when applying for tenure, promotion or an award); the community, or general social context in which the teaching portfolios are developed – such as an engineering department or faculty; and the division of labour – for example, the facilitators for portfolio building are likely to be teaching

experts, while hierarchical decision-making structures for tenure or promotion are likely to be faculty-based. (Teaching experts are more likely to make decisions around teaching awards). Finally, the activity system produces an outcome of the activity, hopefully in this case, a tenure, promotion, or teaching award.

To understand how competence or excellence is demonstrated in a teaching portfolio, the whole activity system has to be studied. The first principle of activity is that the object, in this case the representation of teaching practice, will drive the activity (Engeström, 1999). The focus of this study is the mediating artefact – the teaching e-portfolio – that becomes a proxy for the candidate's practice. The mediating artefact develops as candidates engage with facilitators to find ways of representing, reflecting on and theorising their practice. A number of texts are produced and each text connects to the previous text in a sequential chain, forming a 'genre ecology' (Spinuzzi, 2002). These texts could be personal, academic, or institutional – or a mixture of all three. Texts will generally draw on what Schryer and Spoel call 'regulated' and 'regularized' resources, which are distinguished as follows: 'Regulated resources refer to knowledge, skills, and language behaviors that are recognized and required by a field or profession. Regularized resources, on the other hand, refer to strategies that emerge from practice situations and are more tacit' (2005, p. 250).

An example of a 'regulated' resource might be a faculty policy document, while an example of a 'regularized' resource could be a lecturer's teaching philosophy statement. In explaining genre ecology, Spinuzzi similarly distinguishes between: '(a) genres that are more formally or authoritatively constrained by the activity and (b) genres that represent more grounded, less authoritative, and frequently more individual or local solutions' (2012, p. 487).

The degree of authorial discretion and the emergence of an 'authentic voice' is contingent upon 'beliefs, logics, traditions, and ideologies' (p. 487). Spinuzzi's use of the term 'authentic voice' is a metaphor for the expression of identity within a genre. There is considerable difference across engineering identities as these exist at 'the intersectionality of multiple identities including race, gender, sexual orientation, and affinity towards engineering' (Patrick & Borrego, 2016). Different genres can enable or constrain different expressions of identity or 'voice'. Pelger and Larsson (2018) argue the case for teaching portfolios as enabling genres for the development of a teacher identity (p. 182), while Graves and Epstein consider the genre of a teaching portfolio to be 'multivocal' (p. 344). Teaching portfolios can express both engineer and educator voices and identities through the inclusion of both 'regulated' structures and

'regularized improvisations' (Schryer et al. 2007, p, 26). Schryer et al. argue that '[g]enres are constellations of regulated and regularized improvisational strategies triggered by the interaction between individual socialization, or habitus, and an organization or field' (2007, p. 31). While regulated genres explicitly impose an institutional (or other officially sanctioned) orientation, regularized genres introduce a different orientation dependent on the 'activities from which they are drawn' (p. 31).

Schryer et al. (2007) and Spinuzzi (2002; 2012) understand genre as a dynamic system within which a range of repertoires and practices can be accommodated. Engineering educators can decide what to include or exclude in their e-portfolio from the full range of their practice and the regulated and regularised genres available to them. The genre ecology approach is useful in studies where there are wide textual ranges and variations – such as expert and non-expert texts in teaching and learning contexts. This approach is particularly relevant to researching textual practices in technical contexts, since verbal data are analysed within the larger framework of spaces, contexts, artefacts, and the dynamics of human interaction. In this framework, texts are not simply performed or communicated, they represent the subject's thinking through the representation of their teaching practice. In the case of engineering educators applying for tenure, one would not expect all candidates to have mastered an expert educational genre, but to be engaged in a process of learning this genre, and re-contextualising it in terms of their own engineering field and experience. An ecology of genres is likely to develop in such a context. There will be constant importing, hybridizing, and evolving of genres, although one would not expect the discarding of key features of the genre, such as reflection on practice, in a teaching portfolio.

A methodology for researching teaching portfolios

In practitioner research, there are intersections between research and practice, researchers and practitioners, which was the case in this study. The description in the sub-sections below explain the different strands of academic development work (in this case facilitating engineering lecturers' teaching portfolio development), and educational research (in this case a study of the completed – or almost completed – teaching portfolios with a view to understanding how engineering as socio-cultural context impacted the representation of teaching).

Facilitating portfolio development

The Cape Higher Education Consortium (CHEC), a body that coordinates the work of the four Western Cape-based universities in South Africa, offers regional short courses to academic educators on a range of topics in higher education teaching and learning, including short courses on teaching portfolios. Six academic developers who were employed by the four universities jointly offered two CHEC short courses to science, technology, engineering, and mathematics (STEM) university teachers on developing teaching e-portfolios. The first short course took place over a four-week period, and the second took place over a six-week period. Approximately sixty STEM participants (~15 participants from each university) enrolled in the short courses, attended regularly and completed (or completed a first draft of) a teaching e-portfolio. The course covered key concepts in higher education teaching and learning, such as the higher education context – and why it matters – critical reflection, learning-centred pedagogies, and constructive alignment. The focus of the short course was preparing a teaching portfolio and thus included topics such as different kinds of teaching portfolio, ways of building an e-portfolio, audience, purpose and context, writing a teaching philosophy, and selecting appropriate documentation of teaching and learning. The course used an interactive workshop format, combining short presentations with peer engagement and formative feedback.

The portfolios were assessed online approximately two weeks after the final session and each participant received feedback from at least two facilitators. The feedback was intended to help the lecturers improve their e-portfolios before submitting them to their academic departments for consideration for tenure, promotion, or for an institutional or national teaching award. After completion of the course, the facilitators continued to support participants in their home universities to improve and complete their teaching portfolios. This study focuses on engineering lecturers' teaching e-portfolios.

Researching portfolio development

The research reported on in this paper is part of a larger project on pedagogies in STEM disciplines and fields. The project was jointly funded by the South African National Research Foundation (NRF) and the Swedish Foundation for International Cooperation in Research and Higher Education (STINT). Team South Africa comprised six academic developers across the four Western Cape Universities. The research design for this study was an artefact-based analysis of the e-portfolios submitted by engineering lecturers across the abovementioned

universities. Twenty-four of the participants were in engineering (or engineering-related) programmes. One of the universities does not have an engineering faculty, but does offer related programmes, for example, in information systems and computer science. The e-portfolios of a physics lecturer and a lecturer in statistics were included in the study because they teach physics or statistics *for* engineering. Table 1 shows the participants, their engineering fields and the context of the teaching portfolio.

Table 1: *Participants, fields and contexts*

Portfolio	Engineering field	Context
1	Building construction	Teaching award
2	Building construction	Ad hominem promotion (senior lecturer)
3	Chemical	Teaching award
4	Chemical/polymer science	Tenure
5	Chemical/polymer science	Tenure
6	Civil	Ad hominem promotion (senior lecturer)
7	Computer	Ad hominem promotion (senior lecturer)
8	Computer	Ad hominem promotion (associate professor)
9	Electrical	Ad hominem promotion (associate professor)
10	Electrical	Ad hominem promotion (full professor)
11	Electrical	Ad hominem promotion (senior lecturer)
12	Environmental	Teaching award
13	Food technology	Teaching award
14	Mechanical	Ad hominem promotion (senior lecturer)
15	Information systems	Ad hominem promotion (senior lecturer)
16	Information systems	Ad hominem promotion (senior lecturer)
17	Information systems	Teaching award
18	Information systems	Ad hominem promotion (senior lecturer)
19	Physics (mechanical)	Teaching award
20	Process	Ad hominem promotion (senior lecturer)
21	Statistics (electrical)	Tenure
22	Systems	Ad hominem promotion (senior lecturer)
23	Systems	Ad hominem promotion (senior lecturer)
24	Transport	Ad hominem promotion (associate professor)

The portfolios were analysed to identify the features of their genre ecologies, after which the findings were synthesized by locating the genre ecologies within the portfolio-building activity system. As a researcher, I had access to all the portfolios, which were submitted as digital documents or as links to candidates' own websites. Other studies with portfolio course participants focused on teaching identities in different disciplines (Winberg & Pallitt, 2016) and on participants' perspectives on teaching portfolios and the portfolio-development process (Winberg et al., 2018). In this paper, the focus is on the e-portfolios themselves, with a view to understanding how the engineering socio-cultural context impacted the candidates' representation of their teaching practice.

Findings: engineering the teaching e-portfolio

The teaching portfolio has settled into a recognisable genre with five clear textual identifiers: 1) a statement of the author's teaching philosophy; 2) a description of the teaching context; 3) examples or descriptions of teaching practice and rationales for these practices; 4) elements of critical reflection on practice, and 5) the portfolio usually has appendices of evidence that are linked to the claims in the body text. All the portfolios had these generic similarities, but distinct differences were found in how the generic components were understood, resulting in different genre ecologies. It was expected that differences would be evident in the portfolios intended for tenure, promotion and awards on the assumption that tenure portfolio authors were novice while promotion and awards authors were more experienced educators. However, this was not the case. Novice and experienced subjects (i.e., tenure applicants and ad hominem applicants) produced similar teaching portfolios, while the award portfolios were significantly different.

Teaching portfolios for tenure/promotion: foregrounding the reward

In teaching portfolios for tenure or promotion, the object is to represent applicants' practice at the appropriate level of competence (lecturer, senior lecturer, etc.). Such portfolios are usually assessed by the head of department and members of the faculty, and often include a teaching and learning specialist. Teaching portfolios for tenure and promotion are 'high stakes' portfolios and, if the submission is successful, can have considerable benefits for the applicant. Of the 24 portfolios studied, the majority (18 portfolios) were submitted for tenure or promotion (tenure n = 3, senior lecturer n = 11, associate professor n = 3, and full professor n = 1). These portfolios were generally written in an impersonal style that was closer to that of

an academic engineering style of writing than an educational style. There was a predominant use of the passive voice, shorter and more succinct text, and a vocabulary that was more engineering-focussed than educational. In demonstrating their competence, the engineering academics showed how their teaching practice was aligned with the institutional or departmental mission and vision. They therefore drew on 'regulated' resources, such as the institutional website to provide an official version of the higher education context, rather than describe their lived experience of it. They introduced themselves formally (in the style of a covering letter for a job application) explaining their roles and responsibilities (sometimes in the third person). Candidates tended to describe their practice with reference to similar official documents, such a course or syllabus outline, teaching materials used (sometimes several files of teaching materials were included as appendices), and links to, or screen-shots of, their learning management system. Applicants were careful not to critique their institution or department. Reflection was usually understood as planning *for* practice (rather than reflection *on* practice), in other words, reflection was understood as planning towards improvement – and checklists, improvement plans and teaching syllabi for the next year were often included as the result of reflection or evaluation. Reasons why improvement might be necessary were generally absent. In some cases, the appendices contained a short list of references consulted, usually the references that were supplied during the training sessions, although some portfolios referred to articles in engineering education journals. More common than references were the inclusion of inspiring quotations, usually unreferenced. The appendices included lists of materials (a table of contents was usually supplied to guide the assessor), some analyses of students' feedback (often from standard student evaluation forms) and the candidate's CV or link to an academic site, such as ResearchGate.

The following example is typical of the style of introductions:

> The candidate received a Masters of Statistical Science in 2016 from [name of university] after 15 years in the corporate sector, entered academia in June 2016. Being a relatively new 'hybrid' academic, the candidate has allowed herself one year to focus on teaching, after which she will commence the PhD in July 2017. Her research interest incorporates statistics, finance and engineering in the context of South Africa. It is important to maintain a balance between teaching and research as this approach will positively benefit my students and my discipline at large (Portfolio 21).

Notice how the applicant shifts the focus away from teaching towards her research trajectory, having allowed herself 'one year to focus on teaching'. When writing about her

personal mission to find 'a balance between teaching and research' she slips into the first person and a more personal writing style – moving from a regulated to a more regularised discourse style.
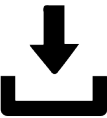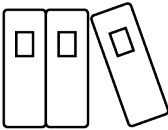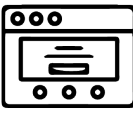
The genre ecology of the portfolios for tenure and promotion (Figure 2) was generally strongly regulated, that is, institutionally-aligned; for example, including quotations from the institutional vision and mission, providing links to the departmental prospectus, and using official descriptions of the institution context (such as those found on the institutional websites). Images and videos of generic engineering students in non-specific laboratories were taken from the website to represent the context. Descriptions of practice were short and aligned with institutional or professional requirements:

> In this course there is a strong focus on professional values, ethics and governance. This is essential because the profession is moving towards strengthened codes of conduct, regulation and legislation. Thus the [engineering] qualification has an increased focus on professionalism and ethics (Portfolio 2).

In the above example, which is fairly typical of the promotion portfolios, teaching is explained in terms of the official curriculum, or of regulatory council requirements, rather than described in terms of classroom practice. Evidence of teaching claims was offered with reference to a subject Learning Management System, official curricula or syllabus documents and teaching materials.

Figure 2 shows the genre ecology of teaching portfolios for promotion, which were notable for their formality, use of official documents, uncritical view of the institution, lack of detail on context, and close approximation to an engineering, rather than educational, writing style.

The column labelled 'genre rules' indicates that the expected elements of the teaching portfolio genre were present: there was a teaching philosophy statement, a description of teaching context, a description of and rationale for the particular practices adopted, a reflective section and appendices of evidence to support the claims made. However, the focus across all sections of the portfolio was the expectation of tenure or promotion. Teaching practice was thereby largely obscured, and was represented in terms of official documents, curricula, or requirements.

	Artefacts		
	Texts	*Images*	*Online*
Teaching philosophy statement	Institutionally aligned	Teaching role	Prospectus
Description of context	Official	Institutional	Department website
Description and rationale for practice	Formal curriculum	Teaching materials	LMS
Reflection	Checklist	Plans	Revised programme
Evidence	Quotations	Graphs, tables	Links (e.g., CV)

Object ⟳ Outcome

Object/outcome reversal
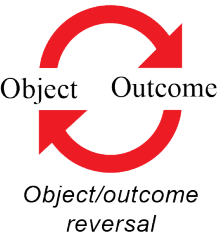
Figure 2: *Genre ecology of a tenure or promotion teaching portfolio*
Images source: https://publicdomainvectors.org

The object, which was to represent practice, was strongly impacted by the expected outcome, the award of tenure or promotion. What seems to have occurred in the tenure and promotion portfolios is that authors reversed the *object* of the system with the *outcome* to the extent that the object (representing teaching practice) was backgrounded and was supplanted by an object that represented the candidate's research trajectories, or professional requirements, possibly recognizing these as important in the social context of an engineering department. Engeström (1987) explains that object/outcome reversals are common in systems that are driven by rewards rather than by the development of subjects.

Teaching portfolios for teaching excellence awards: foregrounding teaching practice

There were far fewer portfolios (n = 6) submitted for teaching awards and, in contrast to the tenure and promotion applications, the portfolios submitted for institutional or national awards adopted a more personal and reflective presentation style. These portfolios had more heartfelt teaching philosophies, more detailed accounts of the candidate's role and responsibilities, and richer descriptions of the teaching and learning context:
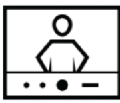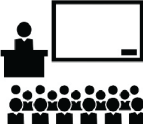
> Our campus is one of the most culturally diversified in South Africa. Most of the students we receive are from the surrounding areas. They are disciplined and hardworking. Though they tend to undermine their capabilities, they have great potential when you provide them with proper guidance. They are very competitive as well because they do not want to be left behind by others. What drives me in teaching is the value that I add in making young people's life better. I believe that I am responsible for making our country a better place through a most powerful tool called education. I started teaching while I was in high school by helping my classmates when they didn't understand something and took over lessons when our teachers were late or absent, and that was not only limited at school – in sport and at church it was and is the same. I believe that teaching is in me. I see myself as a coach of a team who appreciates credit for the achievement of my students and take a blame for those who become unsuccessful and try to find remedies for their next attempts (Portfolio 13).

The above applicant strongly identified with teaching: 'teaching is in me' she explains, giving examples from other contexts. Here practice is foregrounded, not obscured. The focus on teaching practice, the rich descriptions of context (both the students' and her own), the candour, and her commitment to students were not seen in the tenure and promotion portfolios.

In addition to sharing personal information about their teaching journeys and future trajectories, the award applicants described – and theorised – their practice in richer detail, and with very little recourse to official documents:

> The core of my lesson plan, and discussed in greater depth in section 4, is a flipped classroom [reference] approach which encourages active, prolonged, positive engagement with constructs. Lecture time is repurposed into workshop sessions, and open and group debate and discussion is fostered. It is structured such that peer-to-peer, collaborative problem-solving is enabled (Portfolio 19).

	Artefacts		
	Texts	*Images*	*Online*
Teaching philosophy statement	*Personal*	*Affective*	*Own website*
Description of context	*Descriptive*	*Classroom*	*Photographs*
Description of and rationale for practice	*Narrative*	*Student work*	*Resources*
Reflection	*Theorised, critical*	*Process, journey*	*Blog*
Evidence	*Reference list*	*Evaluation*	*Educational research*

Object → Outcome
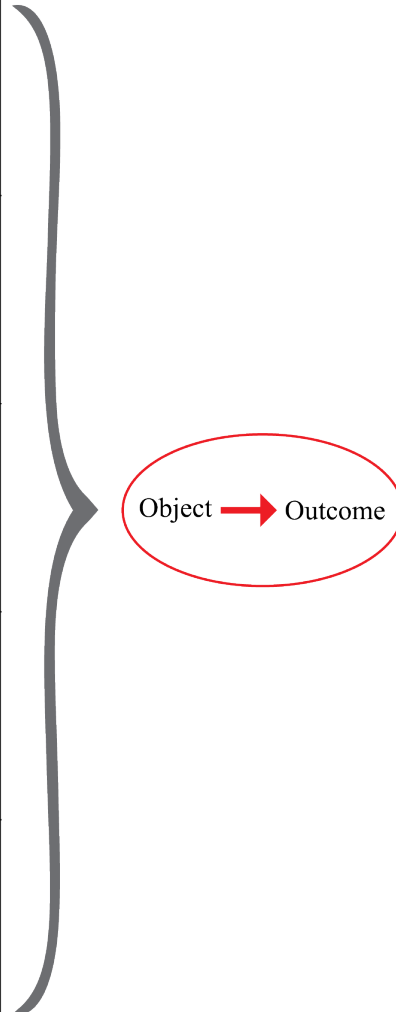
Figure 3: *Genre ecology of a teaching portfolio for teaching excellence awards*
Images source: https://publicdomainvectors.org

Although engineering discourse entered the description (e.g., lecture time being 'repurposed' and 'structured') it is predominately descriptive of teaching practice. Teaching portfolios for awards were reflective, drawing on the higher education literature and theory to frame teaching and learning decisions:

> I was inspired by the 'authentic learning' [reference] approach as it makes a sense in chemical engineering. I like to connect my students with actual workplaces. Students obviously learn outside of the classroom and I make use of this to make the connection with practice stronger. Linking what they are doing in the classroom with what they see in industry and having a discussion with a real engineer has been beneficial to my students… (Portfolio 3).

An award applicant explained his understanding of good assessment practice as follows:

> I learned that there is a theory behind rubrics (such as Bigg's Solo Taxonomy or Boud and Molloy's four characteristics of sustainable feedback) and I wanted to share this understanding with my own students. Thus students and I developed an assessment rubric together to help the students to become leaders in their own learning (Portfolio 1).

The genre ecology of the teaching award portfolios (Figure 3) was characterised by a personal writing style that combined narrative and theoretical modes, the use of photographs of candidates' own students (i.e., not from an institutional website), rich and detailed descriptions of the teaching and learning context (also accompanied by photographs), and theorised descriptions of the teaching approach used. Both formal (e.g., institutional evaluation forms) and informal (e.g., unsolicited emails) student feedback was included in an appendix or integrated into the text of the portfolio. Most portfolios included a list of references. In two cases, the applicants had published educational research, and included a link to their articles. The award applicants were clearly proud of their teaching achievements, as most of the award portfolios were online and widely accessible.

In contrast to the tenure and promotion portfolios, there was a clear focus on the object of representing teaching practice, and an expectation that the outcome would flow from the representation of a high standard of practice.

Discussion: unpacking the object/outcome relationship

Activity Theory tells us that the object drives the activity system, thus conflating the object and outcome is likely to cause 'contradictions' in the activity system (Engeström, 1999). Activity Theory views such contraditions in the activity systems as learning points. In this case the contradiction can be attributed to the high stakes nature of tenure and promotion. The high stakes context created tensions between an engineering and a teaching identity and led applicants to conceal their teaching practice rather than describing and reflecting on their practice. In the award context, the stakes were low (in comparison with tenure or promotion) and it was therefore unlikely that the social context of engineering would have as much influence.

The portfolios therefore fell into two groups: the award group portfolios were focused on the object of representing their teaching practice as theory-informed, student-centred and reflective, while in the tenure/promotion group teaching was represented in alignment with

institutional values and departmental goals. The difference between the portfolios that demonstrated reflective practice and those that demonstrated alignment with the department was their choice to foreground a teaching identity or an engineering identity: 'Professional identity is primarily regarded as a product of professional socialisation and training. This type of socialisation produces a strong resistance to 'external' intervention in the fabric of education' (Michelsen et al., 2017).

Thus in portfolios for tenure and promotion, the engineering identity was foregrounded and resistant to influences of the 'external' educational identity. In the teaching award portfolios the teaching identity was foregrounded and the engineering identity was, to a certain extent, backgrounded to accommodate the new identity. The tenure and promotion portfolios were not primarily written for an expert teaching audience, but for an audience who would judge it on its competence as understood in the departmental context.

The dynamics of how the activity system was reflected in each individual portfolio is unique. The tenure and promotions portfolios obscured teaching, but practice was not entirely invisible; the award portfolios foregrounded teaching, but an engineering identity was not entirely obscured. Thus while there were differences in portfolios for promotion and awards, these differences were complex and contingent upon the extent to which authors felt themselves enabled or constrained by the social context of the activity system. This sometimes made it difficult to fit portfolios cleanly into one or other category. Thus while the genre ecosystem of the teaching portfolio is strongly supportive of a teaching identity, it can also be transgressive and challenge accepted ways of being an engineering educator.

When items are more difficult to categorise precisely, a genre ecology analysis is particularly useful (Zachry et al., 2008). Locating an applicant along a continuum of revealing or concealing practice, for example through appropriate portfolio assessment rubrics, could help both academic developers and applicants to understand how their portfolios (and their teaching) could be enhanced. Portfolios for tenure, promotion and awards are inevitably different, but applicants, over the course of an academic career are likely to develop portfolios for different purposes and it would be helpful to understand the expectations of each, as well as how to meet their expectations more expertly by drawing on a more appropriate genre ecology.

Conclusion: implications for facilitating the development of teaching e-portfolios

The study addressed the research question: how does the social context of a teaching portfolio impact the representation of teaching practice? The genre ecology of a range of engineering educators' e-portfolios were studied in order to identify the different ways in which teaching practice was (or was not) represented in portfolios that were submitted for tenure, promotion or awards. That the object/outcome reversal drove differences in the portfolios was not an unexpected finding; what was unexpected was the strength of the differences. The differences between portfolios that expressed a stronger engineering identity and those that expressed a stronger educator identity were congruent with differences in reporting styles. The tenure and promotion portfolios were more compliant and formal; the award portfolios more reflective and personal. When the object and the outcome were reversed or conflated, the teaching portfolio tended to obscure teaching practice.

These findings have implications for academic development practitioners, engineering educators, and managers. More research is needed to find out how engineering educators could be supported in enhancing their teaching practice while demonstrating their development and growth in the process of applying for tenure or promotion. The study suggests, firstly that there is a need for academic developers, ad hominem promotions committees and applicants to develop a principled understanding of teaching trajectories at different levels. Academic developers could encourage applicants to draw more on their own experiences, rather than revert to compliance and the official website, while acknowledging the importance of alignment with a department's teaching and learning goals. Academic developers should accept discourse styles that might be more compatible with an engineering identity. Ad hominem committees could be made more aware of trajectories of teaching competence and consciously reward more reflective representations of teaching.

The study of the genre ecologies of the portfolios made the dynamics of the activity systems more visible, showing how the representation of teaching could be understood as an arena of conflict and tension between strong engineering and emerging educational identities. In Activity Theory these contradictions in the system are viewed positively as areas for change and growth. Activity Theory and genre ecology offered a way to systematically analyse these related sets of contradictions as we further examine portfolio development in increasingly complex, multidisciplinary higher education teaching practices.

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