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Academics Reap Benefits From Sowing Engagement With The Scholarship Of Teaching And Learning

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Abstract

Recent years have seen a drive towards the establishment of various Scholarship of Teaching and Learning (SoTL) programmes at institutions of higher education with the primary aim to improve teaching and learning, which may be achieved, in part, by academics who constantly seek to reflect on and enhance their teaching practice by reporting on it in the public domain. The purpose of this article is to highlight the benefits that academics reap from actively sowing engagement with a small SoTL group in Engineering Education. Inspired by humanistic principles and the constructivist approach, the transformative learning theory is concerned with the role of experiential learning and personal development, which is applied in this descriptive case study where quantitative data has been collected over a 9-year period (2014 – 2022). Five tangible benefits are identified, being (1) research funding (funding is received from the government of South Africa for accredited research publications), (2) personal development (on average, each academic completed 9 research publications), (3) career development (3 academics were promoted from a lecturer to an Associate Professor) (4) continuous professional development (continual registration with an accreditation body) and (5) belonging to a community of practice (ongoing support and encouragement is received from other members in the group). It is recommended that at least one member from each department within a faculty be associated with a SoTL group, that may lead to more awareness being created about the benefits associated with such programmes.

Keywords: *unicycle, awareness, impact, development.*

1. Introduction

"Whenever you find yourself on the side of the majority, it is time to pause and reflect [1]". These words, by the well-known write Mark Twain, well illustrate that we cannot always follow the majority, for they are not always right. At times we need to step out of our comfort zone, and do something different, something [1]that can make a difference not to the majority, but to the minority in the world. Changing or improving ones teaching practice has the power to touch the lives of a few students, inspiring them to become something more than what they originally dreamt possible. This, in essence, is the objective of the Scholarship of Teaching and Learning (SoTL).

The purpose of SoTL is the discovery of new knowledge about how to best support learners and instructors through evidence-informed practices [2]. Students need to be supported in

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several ways, so that they may achieve success during their academic studies. These include actively promoting peer-mentorship programmes, creating awareness of supplementary instruction and providing additional academic student support [3]. However, when academics actively engage in SoTL, they further seek to support student learning by improving their own teaching practice. Here again, the words of Mark Twain find application. Teaching, as many academics teach, or doing things the same way as what they have always been done, cannot satisfy the current requirements of education. Education is dynamic, ever evolving, and transformative in nature. Academics on the side of the majority, who pause and reflect on the true purpose of education and who seek to improve the lives of those around them, cross over to the side of the minority and become actively engaged with SoTL as they seek to improve student learning. Academics who actively sow engagement with SoTL can reap many benefits therefrom, and especially when considering their publications relating to their teaching practice. This can result in further research funding, self-development, career development, continuous professional development (CPD) and belonging to a community of practice (COP).

CPD has been defined as the maintenance and enhancement of knowledge expertise and competence of professionals throughout their careers according to a plan that is formulated to meet the needs of an individual [4]. Competence of individuals is not limited to the field discipline of an academic (e.g., Civil, Mechanical, or Electrical Engineering) but should also encompass competence in teaching the discipline. This competence may be discerned in an academic who actively sows engagement with SoTL. Demonstration of CPD is increasingly required for re-certification of professionals in the workplace [5], such as required by the Engineering Council of South Africa (ECSA). ECSA has an online CPD recording system that consists of three main categories, namely development activities, work-based activities, and individual activities. Research publications completed by an academic can contribute 2 credit points per year to individual activities. A total of 10 credits (2 credits per year over a five-year cycle) out of a minimum of 25 required credits can thus be obtained to remain registered as a professional Engineer or Technologist.

A researcher's reputation is influenced by the quantity and quality of his or her publications [6]. These publications are often considered for selection and promotion in academic institutions, which reflects the career development of an academic. A record of these publications is usually kept in a resume or on an online platform, such as LinkedIn, Google Scholar or Research Gate, which enables further public access to it [7]. Publications relating to engineering education would also feature as evidence of an academic’s engagement with SoTL.

Self-development is defined as the process of forming relatively stable attitudes and behaviors through repeated experiences until the stage of independence is reached [8]. An important behavior in higher education is the ability to successfully demonstrate the acquisition of academic writing skills that is evident through the regular publications of an academic. Sowing regular engagement with SoTL enables repeated experiences relating to the completion of a journal article or conference paper that can lead to independence (a mentee in a SoTL program should initially co-author with a mentor until the mentee has acquired sufficient knowledge and skills to produce a sole publication).

Research funding is critical both for the practical execution of a study, as well as for ascent up the elusive academic promotion ladder [9]. The Government of South Africa (SA) provides research funding to institutions for every accredited publication completed by their employees.

This is seen as an incentive to increase the academic publication output in journals which have been accredited by the Government (these include journals listed on the SCOPUS, DOAJ and WSI databases). Both academic and administrative staff may benefit from this research output funding as institutions in SA usually allocate a percentage of the funding received to the author of the article. This can enable the author or researcher to sustain his or her research, leading to further publications.

A COP enables groups of teachers, or academics, to take their often-tacit knowledge and experience and make it explicit for their colleagues and wider professional community [10]. Having regular group meetings through the year enables members to share their latest research topics and findings. It may serve as a sounding-board where members can receive feedback on their teaching practice and on challenges encountered. But most importantly, support and encouragement are received to complete the next conference paper or journal article.

The purpose of this article is to highlight how academics have reaped these benefits as they actively sowed engagement with a small SoTL group in Engineering Education. The SoTL unicycle is firstly reviewed with the goal of explaining what active engagement in SoTL really entails. The theoretical framework, context of the study and research methodology then follows. The results focus on two key figures and one table, followed by the conclusions.

2. Sowing Engagement with SoTL

The SoTL unicycle was first introduced in 2016 [11] as a means to help academics and non-academics to understand what SoTL entails and what it means to fully engage with it on a regular basis. It comprises 8 spokes, as shown in Figure 1, which academics need to engage in at different times over a calendar year or semester.

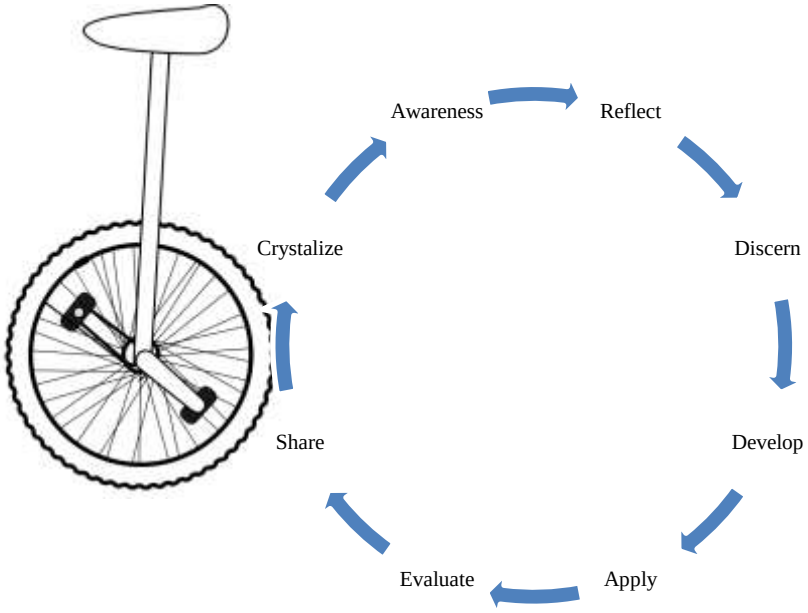

Figure 1: The SoTL unicycle from [11]

It is important to stress that all eight spokes need to be engaged, or the academic will not move forward on the unicycle, or in SoTL. It is recommended to start with the top listed spoke, being awareness (each spoke is defined in Table 1, where a measurement of subjectivity or objectivity

is also noted). The academic then needs to put forth effort to start riding the unicycle, as cycling through the various spokes needs to be learned or acquired over time. Time management skills also need to be enhanced, as the academic now needs to balance several responsibilities at the same time.

Table 1: The spokes of the unicycle explained

Spoke	**Definition**	**Objective / subjective measurement**
Awareness	Becoming mindful of SoTL activities, teaching practices, philosophies, pedagogies, etc.	Subjective, as it is an internal process within an individual
Reflect	Thinking about one's own strengths and weaknesses in teaching and about current pedagogies that can align with different student learning styles.	Subjective, as it is an internal process of the mind
Discern	Prudently decide on what are the gaps, challenges and critical issues which need to be addressed in a specific engineering educational programme.	Objective, as the issues can be tabulated based on specific evidence, such as pass rates or student feedback
Develop	Develop an action plan of improvement based on the previous spoke by asking 'how can the challenge be addressed'.	Objective, as a specific plan or intervention is tabled
Apply	Implement the action plan in one's teaching practice or classroom and keep an accurate record of its results.	Objective, as data-driven evidence can now be collected in the form of pass rates or student feedback
Evaluate	Analyse the results of the previous spoke and interpret its meaning regarding teaching and learning.	Objective, as quantitative and/or qualitative data is now available
Share	Publish the findings of the previous spoke in the public domain, by writing a conference paper or journal article.	Objective, as a research publication is now produced
Crystalize	Review the previous seven spokes and identify key benefits or results that have accrued from it for students and for oneself.	Subjective, as it is an internal process that can highlight a variety of non-tangible benefits

3. Theoretical Framework

Inspired by humanistic principles and the constructivist approach, the transformative learning theory is concerned with the role of experiential learning and personal development [12]. The humanistic theoretical framework asserts that learning about one's own practice is a personal act to change one's own perceptions and actions. Human behaviour, in this study, focuses on how persons, in a social context, are influenced and guided by the personal meanings they attach to their experiences. SoTL is a social act as academics engage with both students (to improve learning) and fellow academics (sharing teaching practices). SoTL is also a personal act of development as academics share their teaching experiences, practices, challenges, and beliefs with fellow colleagues both nationally and internationally.

4. Context of the Study

The Central University of Technology (CUT) has four main faculties on its main campus in Bloemfontein, located in the Free State Province of SA [13]. The four faculties were invited to join a new SoTL programme which was launched institutionally in 2014, after a funding grant was secured from the Department of Higher Education and Training (DHET). The funding grant was awarded by the Government of SA with the primary objective of improving teaching and learning across the country, as the national attrition rate among university students was around 55% in 2013 (these are students who enter university but never complete their qualification). A recent report in 2022 indicates a similar percentage still exists [14]. The funding grant was to be used to facilitate human development, capacitate staff to engage with SoTL on an international basis, create a COP, and to improve the success rate of students in higher education.

This programme was essentially a mentoring program, where an experienced academic (someone with a teaching degree and at least 10 years' experience in educational research) was appointed as a mentor to a small group of inexperienced academics, referred to as mentees. Seven staff members from the Faculty of Engineering, Built Environment, and Information Technology (FEBIT) joined the programme in 2014 as mentees. However, their experience in engineering education was very limited, as they only held a degree in their field of study (Civil, Mechanical and Electrical Engineering). This made it very difficult for them to engage with the jargon and methodologies required in educational research, which is required in SoTL. Nevertheless, the mentor of this group set out to assist these mentees in this regard, having 10 years of educational research experience and having obtained a MEd (Master in Education) qualification in 2007.

The mentees may be classified as new, ex and seasoned mentees. A new mentee is an academic who joins the SoTL programme and completes one conference paper. Ex-mentees are academics that joined the SoTL group, completed one or more conference papers and then left the programme before competing 3 years (this period coincides with the 3-year funding cycle of the programme). Seasoned mentees are academics who joined and remained part of the programme for more than 3 years, going on to produce a sole publication in SoTL as evidence of their growth to independence. They may remain part of the SoTL group, as it remains a COP. In this community, the mentees would attend meetings (where they could discuss their research and challenges), workshops (where they could become more acquainted with educational research methodologies), seminars (where they could present their teaching practice to colleagues from other faculties) and a local SoTL conference (where they could present an abstract on their research that can serve as a basis for a conference paper or journal article.)

The different fields of study necessitated a start-up project that all mentees could engage in without much difficulty. It was thus decided to focus on student perceptions of practical work done in a laboratory. A single questionnaire was developed, for which ethical clearance was obtained, and which was then distributed to students in the three fields. The mentees now only had to formulate their own introduction, literature review and study context relevant to their fields. The methodology would be similar across the fields and then they would interpret their results. In time, the focus of each mentee changed to include student engagement, gamification, design-based learning, graduate attributes, constructive alignment, and online learning.

5. Methodology

A descriptive case study is used with quantitative data. Yin [15] describes three types of case studies. (1) Exploratory; a situation is examined where an intervention produces no single clear result. (2) Descriptive; a situation within a real-life context. (3) Multiple case studies; differences between and within cases. In this current study, the situation corresponds to the introduction of a new SoTL programme at a University of Technology where the real-life context is engineering academics who need to come to grips with the jargon and methodologies relating to educational research.

The number of mentees per year between 2014 and 2022 is presented along with their accredited publications relating to teaching. The amount of third-stream income generated therefrom and the return on investment is also shown. Third-stream income in SA is derived from sources other than state funding and student fees, and includes income from research, entrepreneurial or commercialization activities, fund-raising initiatives and investments [16]. DHET awards annual research credits (approximately $6,600.00 per credit) to institutions of higher education based on their research outputs that they achieved two years ago (this is referred to as n+2, where n is the year in which the outputs were obtained, such as publications, postgraduate students who completed a qualification, patents, etc). A peer-reviewed conference paper would be awarded 0.5 credits, while a SCOPUS based article would be awarded 1 credit.

The return on investment is calculated by dividing the total third-stream income by the funding grant that was awarded by DHET over the 9-year period. The funding was awarded in 3-year cycles, where a new application had to be submitted prior to the start of a new cycle. The funds awarded to each mentee over this 9-year period were recorded by the mentor. These funds were used to cover conference attendances (travel, accommodation, and registration costs) and article page processing fees.

6. Results

Figure 2 shows the third-stream income generated by the publications that were produced by all the members of the SoTL group over the 9-year period. The average number of members (including 1 mentor) in the group per calendar year was 7.6. The 2020 calendar year was the most productive year, where ZAR 1,8 million (or $100,000.00) was awarded to CUT by DHET for its SoTL publications. This would be based on the number of publications which were published in 2018 by members of this SoTL group (the n+2 guideline). A percentage (30%) of this was paid to the individual authors that contributed to the sustainability of their research. Figure 3 contrasts the number of publications produced by the mentees as compared to the mentor over the 9-year period.

The mentor produced more publications in 2014, when the SoTL programme was first introduced and then during 2021 and 2022. The mentor concentrated more on journal articles during these last two years, due to the COVID-19 restrictions on international travel which also hampered the mentees in the programme. The only other year where the mentor produced more publications in a single calendar year was in 2017. The 2018 calendar year produced the greatest number of publications for the SoTL group in Engineering Education, being 26 in total (15 from the mentees and 11 from the mentor). The total number of publications for the mentees over this period equalled 64, while the mentor produced 56 in total. This equates to a ratio of 1:0.9, meaning that for every 1 publication produced by all the mentees, 0.9 was produced by the mentor. The publications produced in 2022 have not yet been evaluated by DHET, and thus do not form part of the data given in Figure 1. Table 2 presents a summary of the publications, credits and funding awarded and used during the 9-year period.

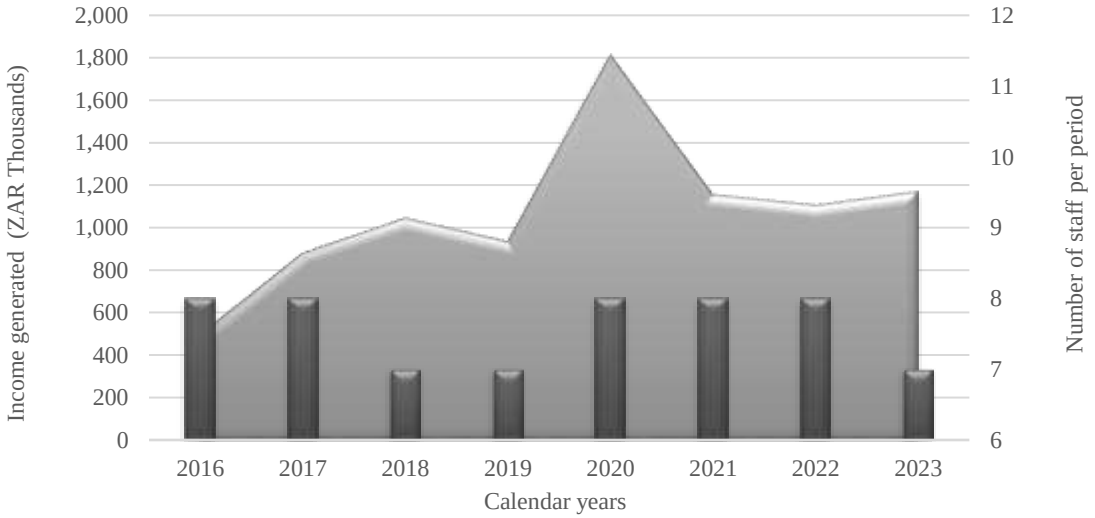

Figure 2: Income generated by the publications and the number of group members (n+2)

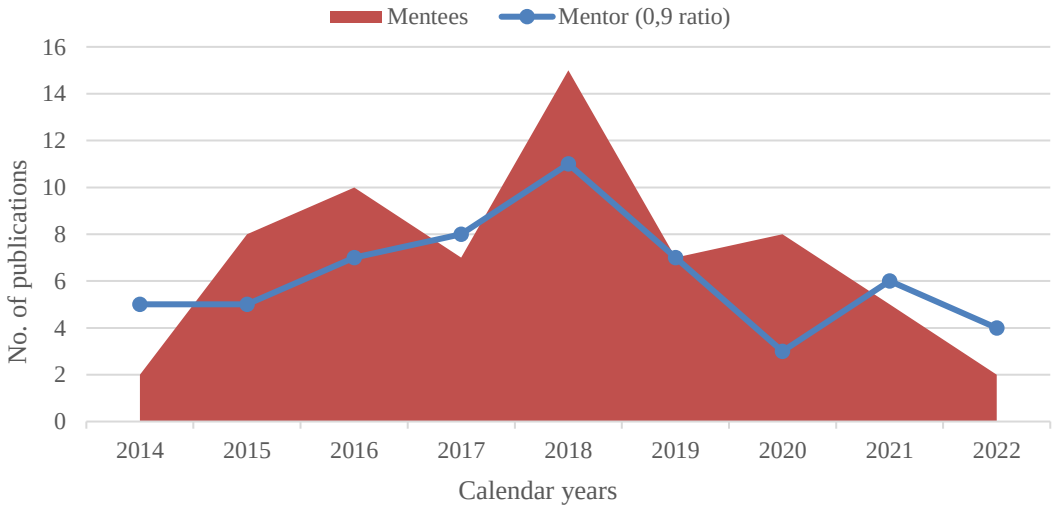

Figure 3: Publication record for the mentees and mentor

Table 2: Summary of the publications, credits, and funding

	Abstracts	Conference Papers	Journal Articles
Publications over the 9-year period	11	80	42
Research credits awarded by DHET		79	
DHET funding generated by all members		R8,600,000.00	
Funding used by all members to attend conferences or pay page processing fees	R1,031,398.69		
Average number of members per year	7.6		
Member contribution per year	R136,507.00 ($7,350.00 or 1.08 research credits)		
Return on investment	834%		

A total of 133 publications were produced, of which 122 (80 + 22) were awarded 79 credits by DHET (recall that 0.5 credits are awarded to a conference paper and 1 credit to a journal article). The average value for a credit over this period was R122,000.00 (or $6,600.00) which then equates to a total third-stream income of ZAR 8,6 million ($500,000.00). This means that each member of the group generated $7,350.00 per year through their publications. The funds used by the members in the group to travel to conference or to cover page processing fees amounted to just over ZAR 1 million ($55,500.00). This equates then to a return on investment of 834% for the 9-year period.

7. Discussions and conclusions

The total number of members (mentees and mentor) over the 9-year period equaled 61 (counting the number of staff per year shown in Figure 2). Obviously, the ex-mentees did not really benefit from the SoTL programme in the long run. They were primarily able to contribute to their registration with ECSA for the time that they spent in the group. However, no sustained research funding did they acquire, nor did they qualify for promotion as part of career development. However, the seasoned mentees enjoyed these benefits. Five members proved to be seasoned mentees who constitute the majority of the SoTL group. These members were able to receive regular research credits from DHET based on their publications, thereby ensuring the sustainability of their research. They were able to increase the number of publications in their resume, thereby testifying to their self-development in the field of scientific academic writing. They were able to share their research and experience with other group members as part of a COP, where they too received ongoing support and encouragement to complete their next paper or article. Three of these mentees further progressed from a lecturer to an Associate Professor, indicating career development.

The purpose of this article was to highlight the benefits that academics reap from actively sowing engagement with a small SoTL group in Engineering Education. The success of the

group was primarily defined by the number of publications that they achieved over a 9-year period, from 2014 to 2022. This descriptive case study focused on the introduction of a new SoTL programme at CUT, where one small group in Engineering Education was analysed. The following five benefits were derived from the results:

1. Research funding: on average, each participating member generated $7,350.00 per year in third-stream income, based on their research publications.
2. Self-development: on average, each mentee added 9 publications to their publication record over the 9-year period which helped them to improve their scientific academic writing skills.
3. Career development: three of the mentees were promoted to the rank of Associate Professor, which depends largely on their research publications.
4. Continuous professional development: all the participating members were able to maintain their professional registration with ECSA.
5. Community of practice: all the participating members were able to receive ongoing support and encouragement to complete their next paper or article.

It must be re-stated that many variables exist that can be used to evaluate the success of a SoTL group. Reviewing only the publications of the members is but one factor, and a limitation of this study. Furthermore, it may be odd to think that a programme meant to improve the pedagogical quality of its participants can be assessed by the number of publications of those participants. However, the number of publications represent an important spoke of the SoTL unicycle that highlights objectively what development or research has been done by the academics relating to their field of study. It exposes the teaching practices of an academic to public scrutiny, helping the academic become aware of further actions that may be needed to further improve student learning. It also helps the academic to better crystalize the SoTL process. One should not forget the purpose of SoTL which is to discover new knowledge about how to best support learners and instructors through evidence-informed practices, practices which are shared through publications in the public domain.

Finding ourselves on the side of the majority in terms of how we teach must create in ourselves a desire to pause and reflect on what we are really accomplishing in education. We need to think seriously about our own teaching practices, seeking innovative ways and refreshed pedagogical approaches that may be used to the benefit of our students and ourselves. It is therefore recommended that at least one faculty member (the minority) from each department be represented in a SoTL programme, that may lead to more awareness being created among other departmental members (the majority) of the impact and success of such programmes.

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