

Transforming self-driven learning using action research

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Abstract

Purpose – This purpose of this paper is to use autoethnographic methods to enable an individual to reflect on their learning practices and habits in their professional role in computing and data science.

Design/methodology/approach – Action reflection cycles with autoethnographic methods are used in this enquiry to examine and transform the self-driven learning in the role of a professional in the context of computing and data science. Data are collected using personal thoughts and emotions in order to determine to what degree the changes that are brought about are improving their learning practice.

Findings – An incongruity between espoused theory and theory-in-use is identified. In this paper the authors explore how engaging in reflection within the structure of an action research framework can change the learning behaviour of an individual, motivating them to engage more positively and consistently with self-directed learning in their workplace environment.

Research limitations/implications – Through analysis of reflective journals key aspects of personal and professional life that influences the individual's approach to the learning tasks is identified. In addition, activity logs are maintained which collect information on the tasks that are undertaken. These activity logs are automatically generated using specific task-tracking software. Double-loop learning (Argyris and Schön, 1974) helps to identify the values that underpin the learning practice.

Practical implications – By resolving the tension created due to the incongruity of values, the individual has been able to find more motivation for learning and thus become more engaged in the learning process.

Social implications – Participation in the knowledge economy requires individuals to engage in continuous learning. Organisations that support individuals in continuous learning are best adapted to take advantage of emergent and evolving knowledge and skill requirements.

Originality/value – This paper examined the behaviour of an individual engaging in self-directed learning and showed how through engagement with reflection and critical self-analysis, he increased his motivation and efficiency for self-directed learning. The authors show how this skill becomes increasingly important in modern knowledge economy workplaces.

Keywords Action research, Double-loop learning, Autoethnographic methods, Self-driven learning

Paper type Research paper

1. Introduction

In this paper we explore how engaging in reflection within the structure of an action research framework can change the learning behaviour of an individual, motivating them to engage more positively and consistently with self-directed learning in their workplace environment. As Blaschke and Hase (2016) note, the twenty-first century knowledge economy workplace is a complex and ever-changing environment. Individuals working in these environments need to understand and direct their own learning as the complexities of the situation demand. The organisation needs to foster a culture in which emergent knowledge can be captured and acted upon quickly. In such an environment, traditional formal training formats are not effective, so other “just-in-time” learning formats become more common. Self-directed learning is one such emergent, just-in-time learning method.

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Ellinger (2004) identifies four typical goals for learners engaged in self-directed learning: skill and knowledge acquisition; enhance learners' ability in directing their own learning; foster transformational learning and critical reflection; and social and political emancipation. The study presented in this paper focusses primarily on the second and third goals, and show how they impacted on the first.

With the increased availability and access to online learning resources both casual and structured, and with the rapidly changing nature of the work environment (Hunt, 2011), it is important that individuals are able to manage their learning. In the IT and computing sector this is particularly significant as Williamson (2015, p. 98) notes, "Owing to intense on-going innovation in the field, programmers are always struggling to learn and adapt to constant change and experience a high degree of 'ignorant expertise' and confusion about what they are doing". This concept of "ignorant expertise" (Ullman, 1997) is further illustrated by Blaschke and Hase (2016) when they discuss how in modern complex and chaotic work environments, "[w]e often have to act long before we have been able to fully understand what is happening". Within the highly fluid world of computing and data science, technologies change very quickly, so technical competence can easily become outdated if there is no programme for continuous professional development (CPD). As these knowledge assets age the professional's value to the company similarly declines. Engineers Ireland, the professional body for engineers in Ireland, identifies this as a problem of "professional obsolescence" and identifies the following five factors as contributing to professional obsolescence in engineering: rapid expansion of technology, rapid turnover of technology, globalisation and cost competitiveness, increasing interdisciplinarity, emergence of new technology/market trends/legislation.

To overcome this, Engineers Ireland (2015, p. 4) point out that CPD ensures that "an individual is equipped to continuously upskill: able to adeptly source new knowledge: and capable of adopting creative and novel approaches". CPD may be pursued in compliance with professional associations or standards, for example, the Association for Computing Machinery (ACM, 1992) or Engineers Ireland or it can be pursued as a self-driven, personalised plan (Hunt, 2008; Hunt and Thomas, 2000).

In this enquiry, action reflection cycles with autoethnographic methods are used to examine and transform the self-driven learning in the role of a professional in the context of computing and data science. The study sets out to conduct a rigorous self-analysis of data collected from reflective journals, computer usage software and external indicators of progress, such as milestones and other progress indicators, for example, online courses.

This paper is organised as follows: in the next section, we review the literature which has informed and shaped this research, examining in particular heutagogical theory, reflective practice and action research, and research into engagement and drive. Following this, we present the context of the study where details of the motivation and goals of this research are presented. We then explain how the data are collected and how validity is ensured by triangulating journal data with an objective activity log built using a time-tracking software package. Having outlined the conditions in which the study occurred, we present an analysis of the collected data and show how a change in learning practice was effected. We conclude with some observations on our findings and discuss how the methods used here may be useful for others engaged in action research.

2. Literature review

2.1 Heutagogy

In the paper, "From Andragogy to Heutagogy", Kenyon and Hase (2001) set out the essential differences between heutagogy (self-determined learning) and the more traditional pedagogic approaches. They draw a distinction between andragogy (Knowles, 1978, as

cited in Blaschke, 2012) and heutagogy, in that while both andragogy and heutagogy are directed by what the learner wishes to learn, heutagogy goes further in that it “recognises the changed world in which we live” (Kenyon and Hase, 2001, p. 2). Heutagogical approaches try to address the issues associated with rapidly changing technology, the needs for flexibility and immediacy of learning in the workplace and classroom. Furthermore, heutagogy also “looks to the future in which knowing how to learn will be a fundamental skill given the pace of innovation and the changing structure of communities and workplaces” (Kenyon and Hase, 2001, p. 2).

It is this aspect of heutagogy that is of most significance to this study. Knowing and understanding one’s own learning practice gives one autonomy and control over their modes of learning and learning environment, as well as control over the curriculum and material to be learned. This sense of mastery and autonomy is important for self-motivation, learner persistence and perseverance (Duckworth *et al.*, 2007). McLoughlin and Lee (2010) discuss the need for a constructivist approach to learning, wherein students become producers and consumers of educational content. In producing new material they are contributing to their community, engaging in “legitimate peripheral participation” (Lave and Wenger, 1991), and also moving towards “full participation in the socio-cultural practices of this community”.

Canning (2010) discusses strategies to encourage mature learners to develop into self-directed learners using reflective practice and a blend of andragogical and heutagogical techniques to bring in their own interests and experiences. Canning highlights the strong emotional energy that may be at play in adult learning, both positive and negative, and how this can affect the learning experience and concludes that the confidence and self-belief engendered in the students through their reflective practice gives them the motivation and the desire to become agents of change and to create learning opportunities in a culture of openness with others. Crotty (2014) also highlights the key role of reflection in transforming thought into action and the importance of connecting the head with the heart in the learning process to avoid a fragmented learning experience.

2.2 Reflective practice

An important aspect of heutagogical models is the role played by reflection and critical analysis in helping to determine the learner’s educational goals and needs. Furthermore, the autonomy and flexibility of heutagogical models are managed well when incorporated into a reflective practice. The importance of reflection on practice and reflection on learning was recognised and promoted by Dewey (1933). Dewey’s own thoughts on the necessity of reflection for critical judgement of one’s situation are illuminating:

Thinking begins in what may fairly enough be called a forked-road situation, a situation which is ambiguous, which presents a dilemma, which proposes alternatives. [...] Difficulty or obstruction in the way of reaching a belief brings us, however, to a pause. In the suspense of uncertainty, we metaphorically climb a tree; we try to find some standpoint from which we may survey additional facts and, getting a more commanding view of the situation, may decide how the facts stand related to one another. (Dewey, 1933, p. 11)

The idea of double-loop learning involves critical reflection upon goals, beliefs, values, conceptual frameworks and strategies. Argyris and Schön (1974) believe that this way of learning is critical when organisations and individuals are in dynamic and uncertain situations. Double-loop learning occurs when learners “question and test one’s personal values and assumptions as being central to enhancing learning how to learn” (Argyris and Schön, 1974, as cited in Hase, 2009, pp. 45-46). Double-loop reflection reveals the difference between what the individual believes their motives and values are—their espoused theory,

and what their actions and practice show—their theory-in-use. Throughout this study, with the use of double-loop reflection, there is a development and greater awareness of espoused theory and theory-in-use and this awareness will be drawn upon to bring about the necessary changes in learning practices.

2.3 Engagement

For self-directed learning, all engagement must be driven from within. In self-driven e-learning situations, the need for effective focus and engagement is paramount but difficult. Through critical reflection and double-loop learning, one could discover the values and traits that underpin why one undertakes particular tasks. This awareness of one's values and one's ability to change and adjust practice gives rise to a greater sense of control and autonomy. It is this sense of autonomy that leads to greater motivation and engagement (Pink, 2009).

Motivation is often divided into two categories of extrinsic and intrinsic motivation. Extrinsic motivation involves external incentives, such as rewards and punishments, while intrinsic motivation is based on internal factors such as self-determinism, curiosity, challenge and effort. (Santrock, 2005, p. 428).

In the area of self-driven learning, one important aspect is finding the time and energy on an on-going basis for keeping up with a learning plan (Schwartz and McCarthy, 2007). The establishment of good habits is highly important to achieve and maintain consistent performance (Duhigg, 2013; Heath and Heath, 2010). This is achieved by using cues in the environment to trigger particular behaviour. After an initial incubation period of up to 60 days (Duhigg, 2013), this behaviour becomes automatic and has become a habit.

In the absence of intrinsic motivation, one method suggested by McGonigal (2015) is to use gamification techniques where some type of external reward is given for successful completion of learning tasks. While short-term engagement can be created using gamification techniques, this will not lead to intrinsic motivation. Intrinsic motivation is important for long-term regular engagement in a learning practice.

Another type of gamification comes from the idea of continuation or completion of a journey. The Duolingo language learning platform (www.duolingo.com) provides two instances of this: a language tree through which one ascends as one's proficiency improves; and a "streak" which is a simple measure tracking the number of continuous days one has logged in and practiced their language learning. Furthermore, these gamified systems often use e-mail and app notifications to remind and prompt users about their daily tasks. This gamification helps the individual to establish a routine over extended periods of time so that it becomes a long-term habit, and thus automatic.

The three topics (heutagogy, reflective practice and engagement) described in this section are investigated in the study described in the remainder of this paper. During the course of this study, Dr Newman was preparing for a new role as a data scientist in a large European e-commerce company.

3. Context of the study

Dr Newman carried out this action research enquiry as part of the Masters of Science (MSc) in Education and Training Management (e-Learning) programme at Dublin City University. Newman's background is in the field of Data Analytics and Computing. In conducting this action research enquiry for the dissertation element of the Master's programme, he drew on autoethnographic methods to describe and explain his practice in self-driven and self-determined learning and professional development. He collected data through the use of reflective journals. In addition, activity logs were maintained which collected information on the tasks that were undertaken. These activity logs were automatically generated using specific task-tracking software. Data were collected over a period of four months from

January 20th to May 23rd 2016. The data analysis stage was conducted three weeks after the final piece of data was collected:

My professional context is based in the Computer Science and Data Analysis sector. The roles I have undertaken in my career have always been in continually evolving fields. Thus to keep abreast of the latest technology and methodologies is an essential part of maintaining my skills and my continuous professional development. I undertook this particular Master's programme in order to gain a greater understanding of the practices and theories in education and educational research.

My background up to the point of undertaking the Master's programme was based in computer science and in a "traditional" scientific approach to research. As such, I consider myself a positivist when it comes to scientific knowledge. As a result of the education provided by this programme I became more open to using research methodologies that I previously would have regarded as unscientific and thus less powerful. I was introduced to the idea of reflective practice at the start of the Master's programme. Prior to this, I would not have been able to fully articulate my values, the influence my values have on my actions, or how I derive purpose from my actions.

This enquiry was borne out of my frustration with my learning practice. Due to a lack of motivation and engagement, I found myself tending to procrastinate or get distracted from my learning goals and tasks at hand. I found that this problem was getting worse as I progressed to increasingly senior roles in my career; over time, I found that I had more tricks and tools at my disposal to counteract my procrastination without necessarily feeling any increase in intrinsic motivation.

The goal in conducting this research was to examine and improve self-driven learning through reflection on practice. Improvements came as the result of observation of self and through experimentation within the action reflection cycles.

The research questions of this enquiry (expressed in the first person to focus the reflective nature) are as follows:

RQ1. What is my learning practice? How do I shape it? How does it shape me?

In answering this question, two objectives will be met. I will make explicit the nature of the practice and the personal values that I bring to it. In making this explicit, first, I establish what values and actions may be modified through the research process, and second, this gives a baseline on which I can show the nature of the effected change at the end of the study:

RQ2. Can I improve my learning practice by improving motivation and engagement?

Here, I aim to identify the types of motivation and engagement that are most effective for my learning practice, given the underlying values that were determined and described by *RQ1*:

RQ3. What techniques and technical affordances are available to help improve motivation and engagement?

This action research enquiry involved a number of learning tasks in the areas of software development and data science. A rigorous examination of the self is achieved through systematic analysis of data collected from reflective learning journals, computer usage software that included type of activity, start time, duration of activity, and external indicators of progress, such as milestones in online courses. The aim in reflecting on this data is to identify the periods of highest engagement and motivation and also to identify when the opposite occurs. In this way the future learning practice and lifestyle can be modified to ensure that these productive periods arise more often.

4. Methodology

In preparing to conduct this research, an action research approach was considered to be most appropriate. Action research is an approach to research where there is a professional intent to intervene to improve practice in line with values that are rational and just, and

specific to the situation. Piggot-Irvine (2006) suggests that the word “action” means that it is an approach that always involves participants making or implementing change, rather than just investigating an issue, and the word “research” means making informed decisions about what and how participants are going to bring about change. The typical cycle of action research (McNiff, 2013; Kemmis *et al.*, 2013) are represented as Plan – Act – Observe – Reflect – Revise – Plan.

Since this research is based on examining and improving one’s learning practice, elements of autoethnography were also incorporated into the study to complement the action research elements. An advantage of autoethnography is the ease of access to data since the researcher calls on his or her own experiences as the source from which to investigate a particular phenomenon (Méndez, 2013, p. 282). In this way, the researcher is not only improving their learning practice but also stimulating others to reflect on their own experiences.

In order to ensure validity and rigour in the research Feldman’s (2003) points were taken into account:

- (1) provide a clear and detailed description of how we collect data and make explicit what counts as data in our work, i.e., provide the details of the research methods used;
- (2) provide clear and detailed descriptions of how we constructed the representation for our data;
- (3) extend triangulation beyond multiple sources of data to include explorations of multiple ways to represent the same self-study; and
- (4) provide evidence of the value of the changes in our ways of being.

Feldman (2003)

4.1 Data collection methods

Reflection journals were used to record my on-action thoughts with regard to the learning I was undertaking, and my impressions on the changes in practice. The journals also recorded some narratives that were prompted by my reflections and actions, such as illustrative stories from my personal experience that may inform or illustrate some particular current behaviour.

RescueTime (www.rescuetime.com) was used to record my activity on the computer, automatically logging start and end times and the types of activity (e.g. software development, communication, social media, writing). The purpose of this analysis is to identify any evidence of a change in my learning practice.

The focus of this study is about my practice and experience while learning. My reflections record how well I feel I am engaging with a particular learning aim, and how motivated I am. They also record any external factors (positive and negative) which are influencing my mood (e.g. feeling stressed at work; getting some good physical exercise; feeling ill). Furthermore, I record observations about any particularly notable affordances in the learning environment.

Following the guidelines outlined by Charmaz and Smith (2003), the reflections are examined in chronological order, and each line of text is coded with one or more tags which denote the themes in that particular line. When all reflections have been coded, the tags are collected and collated into cognate groups to determine the themes that prevail in each cycle and over the course of the entire study. The results of this analysis are presented in the following section.

The RescueTime logs record data related to the duration and nature of my activity on my home computer. RescueTime categorises activities as “Very Productive”, “Productive”, “Neutral” and “Very Distracting”. Analysis of this data can show how well I was engaged

with my learning practice, and whether I was distracted (i.e., multiple visits to sites unrelated to my learning (e.g. Facebook, Twitter) or fully engaged (i.e., one single visit to the course, with an activity duration of at least 40 minutes)).

The RescueTime data allowed triangulation against the reflections. The aim in reflecting on this data is to identify the periods when I was most highly engaged, motivated and happy with my learning (and indeed to identify when the opposite occurs), and then to adapt my future learning practice and lifestyle to ensure that these periods arise more often.

5. Presentation of action research process

In this section, Dr Newman describes and explains the transformation in his learning and professional practices over the course of the action research enquiry. He discusses the findings of the thematic analysis of the journals in order to demonstrate the double-loop learning and subsequent changes in his learning practice.

Presented with the opportunity to conduct this study as part of a Masters course I was undertaking, I set out to perform a full review of my learning practice and the values that underpin it, in order to become more engaged and less prone to distraction and to reduce the stress and frustration that I was experiencing due to the inefficient manner in which I was conducting my learning practice. There are three stages to the findings that correspond to the three cycles of action research that were carried out. For each phase, I will discuss how a change in practice was brought into effect and detected by referring to the analysis of pertinent data sources.

5.1 Cycle 1: discovering my true values

I begin with the intention of documenting how my learning practice was constituted before any experimentation or modification took place. In order to do this, I used learning journals and reflective accounts to examine what I do in a typical learning session:

My reason for starting this examination was to look into and solve the frustration I was experiencing with my practice; I was stressed by my own tendency towards procrastination and distraction. This was recorded in a number of the journal entries taken at the start and end of this cycle.

I'm feeling very flighty these last couple of days. Unsettled, unfocused. I think it's because I don't know where to start with the "study program". (EN, personal communication, January 20, 2016)

And in another journal entry two months later I state:

I'm having trouble getting started on work today. I just can't settle down to focus. I've come to learn that this means I need to take some time to work out the big picture, and look at what tasks need to be done. I can't get started on anything until I know what's next to do. (EN, personal communication, March 18, 2016)

The language used here is "Unsettled, unfocused", "trouble getting started" and points to my frustration with a lack of progress with my learning tasks at that time. However, I have juxtaposed the two entries here as they show how engaging with the reflective process during the cycle helped me to understand one of the root causes of this lack of progress.

In the process of reflecting on my practice, I came to realise that it was not my day-to-day activities and approaches that were the root cause of my frustration. Rather, it was my underlying values, purpose and sense of motivation that were to be found at odds with where I wanted them to be. The data will be discussed in chronological order to most closely reflect the process of examination that I experienced and the process of reflection, revelation and ultimately epiphany that came from the initial examination of my learning practice.

One of the aims of the first cycle was to establish what would be done in the subsequent cycles. So, by design, Cycle 1 was introspective, and in the first few weeks of the cycle much time was spent considering the precise research questions:

The underlying premise is that the casual, episodic, ad-hoc learning has left me with a lot of ungrounded knowledge. I know the how or what but couldn't explain the why [...]. This leaves me uneasy and unconfident in my application of that knowledge. (EN, personal communication, February 24, 2016)

The above journal entry came after weeks of incubation, and indeed of months of literature review and reflection, after having decided to engage in a self-study of my self-driven learning practice. The entry shows that I had identified a felt need to make my practice more efficient and rigorous. However, I was still very unsure about how I would be able to effect a change through the research process.

I concluded the following journal entry with a plan on 24 February 2016:

I need to investigate the literature about the link between reflective practice, deep work, and epistemology and ontology. Given such a link, I can then justify incorporating it into my practice, and showing if and how it brings about a change in practice/engagement/motivation. (EN, personal communication, February 24, 2016)

Following this journal extract a period of time was spent focussing on the literature and it was evident that with the devolution of authority from the teacher as class leader, the student may take on more responsibility for the management of his own learning. There are a number of facets to this responsibility, as discussed in the literature section, and this includes reflective practice (to determine what learners need to know for themselves), and of engagement and focus how to customise the learning practice so that the learner will gain greatest advantage from it. Through the course of the Masters programme I recognised that individuals may view the same event differently depending on their viewpoint and ontological stance.

Thus, I continued the cycle with the aim of developing this research question into a plan of work for the upcoming months. To develop this further, the reflection and introspection (Argyris and Schön, 1974, 1983) continued as I examined my on-going learning. This focus helped me to direct my reflection inwards, to ask why I am learning something in particular and how does it reflect my values.

By thinking reflexively on how something reflected my values, I was confronted with the question: What are my values? This question brought an even tighter focus to my reflections and ultimately to the resolution that marked the end of this cycle. In my reflections, I came to realise that my learning practice was being influenced by my need to be perceived as an expert. By creating an internal pressure on myself to maintain this image of expertise, I was not giving myself the opportunity to be a novice in the subject I was learning. I was approaching the learning, not with a "Beginner's Mind" but with a closed mindset (Dweck, 2012) that meant I was not open to all opportunities for learning.

I originally thought that this closed mindset stems from my career in research (Murphy and Thomas, 2008). On reflection and introspection, I came to realise that this attitude is actually much more deeply-seated and stems from my very early childhood. The essence of this is given in a journal entry recorded as I had this insight:

From a very young age, I was academically smart. School-work came easily to me, and I spent most of primary school at top of the class, or pretty close. This continued into secondary school, but became less pronounced as I was now in a streamed classroom, and so the general standard was higher. Nevertheless, in certain classes (maths, applied maths, physics) I still found myself in the upper quartile (or considered myself to be there, at least; exam results occasionally painted a different picture).

What this boils down to is that I didn't learn how to struggle through something. I either was pretty decent straight away, or I gave up on it pretty quickly. I learned to choose things that were close to what I was already good at. The stuff that I wasn't so good at, I dismissed as unimportant or irrelevant to my goals.

Because I was good early on, I think this reinforced my attitude that the stuff I wasn't good at wasn't important and could be safely discarded as unworthy of my time. I didn't excel at sports, and I wasn't prepared to put in the work to become better. I didn't see that my becoming better would make the team better; I didn't see myself as part of the team. I was out on my own.

This elitist attitude pervades my adult life, albeit it has been tempered so that I'm not absolutely obnoxious. I still expect things to just fall into place for me. That I can drift along and everything will work out ok. I'm hitting 40 now, and I'm starting to realise that I don't really have a strategy – that I never had a strategy – for where I'm going in life. I had goals and aspirations, but no plans to get myself from my current state to the aspired one.

And so, when I didn't achieve those aspirations, I became stressed or depressed or angry. Because I didn't know what to do next. I didn't have alternative strategies. I hadn't even given myself contingent options.

This signified that my own attitudes and egotism were negatively influencing my learning practice. Indeed, my learning was being hampered and weakened by my need to protect my self-image.

The insight that I experienced here is what Argyris identified as the discovery of the distinction between my espoused theory and my theory-in-use. Bringing these two into alignment is a primary concern of double-loop learning (Smith, 2001).

Double-loop learning allowed me to take a completely different attitude into my learning, with an open mindset where I permit myself to make errors, to be seen as a novice by others. Thereby I would be open to more learning opportunities, rather than closed off by trying to project an image of being knowledgeable when that is not the case. Thus my theory-in-practice became more aligned with my espoused theory, that of being a learner.

This transformation in Cycle 1 sets up a new context for the subsequent cycles, where I investigate how my learning attitudes interact with this new open mindset.

5.2 Cycle 2: the importance of planning

In Cycle 2, I set out to investigate how the new mindset would help me to perform and learn in a professional environment. I was in a new role in a new company, and had new things to learn at many levels (technical, cultural, social). For the purposes of this research, I was very interested in seeing how my new mindset might mitigate against any stress that might arise. I also wanted to observe my learning practice under the new environment to see if there was any difference in cultural norms that would help or hinder my self-driven learning.

The beginning of Cycle 2 coincided with the start of my new employment. This new job brought with it many new challenges and demands on my time. The following two journal entries (EN, personal communication, 16 April, 2016) for this period show that I was tired and overwhelmed due to my new job:

But I'm feeling tired, and I'm thinking it might be better for me just to get some rest today. It doesn't feel like I'll get much done so perhaps some general review and note-making. (EN, personal communication, April 6, 2016)

It's been a busy week. I started with Company on Monday and it's been a whirlwind of "onboarding". I was feeling absolutely wrecked on Monday evening, overwhelmed by all the new information and the new situation and all the new people. (EN, personal communication, April 6, 2016)

However, in contrast to my earlier self, I was no longer feeling stress about being in that situation of having to learn many new skills while maintaining an image of professional expertise.

Despite the natural enthusiasm of starting a new job I became less engaged with my learning process at the time. This is evident in the decrease in the number of reflective journals recorded during Cycle 2, and can be attributed to the change in routine, and new workload. Further evidence for the decline is given by the RescueTime data, which is shown in Table I and also in the graph depicted in Figure 1. From these it can be seen the amount of distracting time remained constant from March to April, that is, from Cycle 1 to Cycle 2, but the amount of productive time dropped considerably over the same period.

I had entered Cycle 2 with the hypothesis that having a growth mindset and a smaller ego would bring about less stress and thus more productive learning.

However, during the cycle I had been overwhelmed and tired due to the change in lifestyle and so my focus on learning waned. The lack of engagement is evident in the data. However, despite the lack of engagement, I was still motivated to learn, and there is no evidence of frustration about the decrease in learning. So, while there was definitely much less stress, a growth mindset on its own was not sufficient to keep me engaged with my learning practice.

Reflecting on the second cycle, I came to realise that my new mindset meant that I had not put myself under as much stress as I may have done before. However, there were external stressors that I had not taken into account. Due to the new routine and the new workload, I was not engaging in reflection and self-driven learning as often as I should. However, I was still spending as much time on distractions on the computer as before, as shown in Table I.

Since I had established in Cycle 2 that finding motivation for learning was no longer an issue, I surmised that the lack of engagement was due to a lack of planning ahead; I had not set out a plan for my self-driven learning, which is essential for successful heutagogy (Blaschke, 2012; Kenyon and Hase, 2001).

5.3 Cycle 3: the importance of purpose

For the third cycle I implemented some gamification techniques to investigate their ability to counteract the lack of engagement. I set reminders in my calendar that set the task for each

Month	Distracting (A)	Very productive (B)	Productive (C)	Neutral	Total	Ratio (A: A+C)
February	135:25	48:16	4:35	17:41	205:57	39.03
March	71:46	41:17	2:15	12:06	127:24	60.66
April	71:12	12:25	1:38	6:49	92:04	19.73
May	48:50	21:36	1:14	4:46	76:26	46.76

Table I.
RescueTime statistics

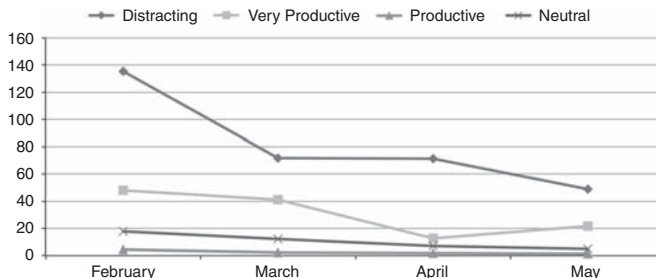


Figure 1.
Graph of
RescueTime data

day, and I set out to maintain a “streak” of learning days, that is, engaging in learning for an unbroken span of days.

As I went through this period, I felt that the gamification was helpful in keeping me focussed. I was successfully maintaining streaks and hitting the daily targets. And the longer I went, the more momentum, and reason I had for continuing to maintain the streak, since there is much more investment (and more to lose) in a 30-day streak than a 3-day one.

I described these findings during a review meeting with peers (fellow students OB and VW and my supervisor Dr Farren) on 18th May 2016 and I was asked if I was actually still being effective in what I was doing, that is was I learning effectively, or had my focus turned to the feat of maintaining the streak? In the moment, during the meeting, I said that I was still learning that my focus was on the task. However, the following day when reflecting on the meeting, I realised that this was not the case. I was no longer doing the task for the sake of learning. I was doing it to maintain the streak.

Looking back over the three cycles, I see that it was not novelty or gamification or revelations on ego that were making my learning more effective. In each case of successful learning, it was that I was actually mindful and aware of my learning and learning goals. I knew the purpose and aim of the particular task I was tackling. Where my learning was not effective, I had drifted away from a clear picture of the goal and was going through a process out of habit and not approaching it in a mindful way. The following journal entry shows a rediscovered confidence and self-awareness that was not present before the study:

See what happened here? I set myself a purpose, after a little reflection. But with a definite purpose, I was able to devise a strategy and plan the first step on achieving the goals that lead to the purpose. More of this. It takes a little bit of mindfulness, a little discipline, a bit of self-awareness. And some calm detachment. (EN, personal communication, May 18, 2016)

This entry shows that I was now much more aware of how being reflective and purposeful in my actions can help to increase my engagement with my learning process, or indeed any task. There is a distinct contrast between the definitive tone of this entry and the frustrated, uneasy tone of the journal entries cited in the earlier discussion of Cycle 1. The increased productivity in this cycle was also recorded in the RescueTime data in Table I. The Ratio column shows the ratio between productive usage and distracting usage. The data show that the ratio was high in Cycle 1, dropped in Cycle 2 but regained productivity in Cycle 3. As discussed earlier, the productivity of Cycle 1 was driven by my enthusiasm for the novelty of the situation, which was absent in Cycle 2. Thus, the data show that the improved ratio in Cycle 3 is attributable to the actions undertaken in this cycle. In summary, the journals and usage data for Cycle 3 both serve to demonstrate the transformation that occurred in my learning practice over the course of this action research study.

6. Review of research questions

The original research questions in my enquiry were:

- RQ1.* What is my learning practice? How do I shape it? How does it shape me?
- RQ2.* Can I improve my learning practice by improving motivation and engagement?
- RQ3.* What techniques and technical affordances are available to help improve motivation and engagement?

The aim of these questions was to ascertain and make explicit the personal values that underlie my learning practice and to see what influence this has had on my learning practice to date. *RQ1* established an insight into the values that are most significant and those that were to be modified through action research in *RQ2* and *RQ3*. The nature of these questions suggested that a study that combined action research and autoethnography would be appropriate.

In this paper, I described how I used this approach to perform self-analysis and reflexive thought in order to effect the change in learning practice that was sought. It was of primary importance to be able to show that a change had indeed occurred as a result of the action research that was undertaken. In Cycle 1, through an engaged and sustained period of reflection and introspection, I came to a revelation about myself and my mindset that allowed me to answer research question *RQ1*. Furthermore, this same revelation put me in position to answer *RQ2*, on improving my learning practice, given that I had received a large boost of motivation from the change in mindset. In Cycle 2, I found that an open mindset was not sufficient to maintain a learning practice in the face of external stressors and pressures such as starting a new job. This provided an additional insight on top of that from Cycle 1: it is not sufficient for me to have a growth mindset when it comes to learning practice; I must also maintain a schedule or routine to prevent the learning from getting sidetracked by more urgent tasks.

Thus, in Cycle 3, I tried to address the drop in performance in Cycle 2 by using gamification techniques (*RQ3*) that would allow me to regularly attend to my learning tasks. On the surface this seemed to be effective, but on reflection, my focus had slipped from the learning task itself to the job of maintaining the routine of the task.

During the process of this study it became clear that the key for most effective learning in my case was to always focus on the learning task of the present. Previous to this research, when learning I would be thinking ahead to what I would be able to do in the future when the learning would be finished. This aligns with my situation before the study where my learning was effective for particular ad hoc episodes, but in general I would start well but interest and focus would wane shortly thereafter because I had no clear goal or focus for the study.

During the research, I had momentarily got focus on the learning task itself, but lost that, in Cycle 2 through distraction from external factors, and in Cycle 3 through focus on maintaining the “streak”, rather than on the learning task itself.

Thus, the research questions were answered. A change in my learning practice was evident from my learning journals and also from the tracking software, which showed how my focus varied over each cycle. In order for me to maintain effective learning practice, I need to be mindful of my goal and to stay focussed on the learning task at hand.

6.1 Reflections

Action research is never complete. The methods and habits of reflective practice that I have developed will always be at hand, and since they have already shown their usefulness in learning and in work, I will continue to use them regularly and frequently.

My findings on being consciously aware of how I approach each learning situation have allowed me to change my mindset on learning and on work. This has in turn eliminated much of the stress and pressure that I was placing upon myself to perform to a particular standard. I feel that there is still work to be done here to further develop this understanding of myself. I also feel that there is work that could be done to develop this for others to help with their learning and professional practices.

While the findings here cannot be trivially transferred to another context, the methods by which the findings were made are sufficiently generic to be applied readily by others:

- (1) changes to my learning practice were brought about in the framework of action research;
- (2) double-loop learning was used to change my approach to learning and my self-perception;
- (3) autoethnographic methods may allow “my world of experience to inspire critical reflection on your own” (Bochner and Ellis, 1996, p. 22); and
- (4) software tools were used for external data collection to provide triangulation.

The methods and frameworks enumerated above can help to increase triangulation in the data. Having a reliable, trustworthy data set allows for a thorough analysis to be made. The continuous analysis afforded by the journals and reflections means that findings and revelations can be acted upon immediately, allowing for a very agile and adaptable practice.

Furthermore, by maintaining the rigorous data collection methodology, the action-researcher can verify that the changes in their practice are attributable to the changes in attitude, values or methods that they put in place following their findings.

7. Discussion

This paper examined the behaviour of an individual engaging in self-directed learning and showed how through engagement with reflection and critical self-analysis, he increased his motivation and efficiency for self-directed learning. The study used both “in-action” and “on-action” modes of reflection through journaling and the action research framework, respectively. This reflection brought about a transformation in the learning practice of the author, as shown in Section 5. Furthermore, the reflections ensured that the learning being undertaken was appropriate for the skill and knowledge requirements emerging in the new working environment, allowing for the redirection of learning focus as necessary. These affordances match the self-directed learning goals specified by Ellinger (2004) and outlined in the introduction section of this paper.

Self-directed learning is one solution to meet the continuous learning demands that are placed on today’s knowledge and information workers as it allows for just-in-time learning as new requirements arise (Blaschke and Hase, 2016). Organisations involved in knowledge economy need to be able to adapt quickly to the fast and frequent changes and demands in twenty-first century business and technology (World Bank, 2003). Organisations can ensure their ability to meet these demands by fostering a culture in which self-directed learning is encouraged, and where their employees and workers are intrinsically motivated to continuously learn new skills and adapt to new situations. We have shown how the methods used in this study have been beneficial to the self-directed learner in the modern workplace.

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