

An examination of what metaphor construction reveals about the evolution of preservice teachers' beliefs about teaching and learning

Aisling M. Leavy^{a,*}, Fiona A. McSorley^a, Lisa A. Boté^b

^a*Mary Immaculate College, University of Limerick, South Circular Road, Limerick, Ireland*

^b*College of Education, University of Maryland, College Park, MD 20742, USA*

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Abstract

Examination of prospective teachers' beliefs about teaching and learning on entry to teacher education programs, and tracking the development of these beliefs in light of academic and field-based experiences, is a critical task for teacher educators. The study examines metaphor construction as a tool to gain access to, and promote the development of, prospective teachers' beliefs through the incorporation of reflective activities that integrate academic and field-based experiences. Specifically, this research examines how metaphorical representations of preservice elementary teachers' in the United States and Europe changed and examines the factors influencing the development of beliefs and the modification of metaphors.

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1. Introduction

In T.S. Elliot's poem 'The Family Reunion' a young man protests to his relations, 'You are all people to whom nothing has happened, at most a continual impact of external events'. Elliot's observation applies to teacher preparation programs in Ireland and the United States. As in most countries in Europe, student teachers in Ireland follow courses comprising academic subjects,

courses in educational sciences, methodologies and teaching practice (Coolahan, 2001, p. 350). While noting our high quality recruitment (OECD (Organisation for Economic Co-operation and Development), 1991; OECD (Organisation for Economic Co-operation and Development), 2003), it is readily recognized that the programmes in the Colleges of Education are overcrowded and that our student teachers have little time to reflect on their course content and teaching experience in any meaningful way (Department of Education and Science (DES), 2002, p. 9; Hall, Marchant, & Ghali, 1999). In the United States, public interest in teacher education has remained at an all-time high since the 1980s when *A Nation at Risk* was published. This

*Corresponding author. Tel.: +301 405 6343.

E-mail addresses: aisling.leavy@mic.ul.ie (A.M. Leavy), fiona.mcsorley@mic.ul.ie (F.A. McSorley), lbote@umd.edu (L.A. Boté).

document raised national awareness of the need to attract large numbers of high quality teacher candidates and to improve their education and training. Reports such as *Tomorrow's Teachers: A report of the Holmes Group* (the [Holmes Group, 1986](#)), *Tomorrow's Schools of Education* (the [Holmes Group, 1995](#)), and *A Nation Prepared: Teachers for the 21st Century* ([Carnegie Task Force on Teaching as a Profession, 1986](#)) all indicated that existing teacher education programs are inadequate to fill public schools with teachers prepared to educate students in the 21st century. In response to these early reports as well as to more recent reports and initiatives such as *The National Commission on Teaching and America's future* and *NCATE* (National Council for Accreditation of Teacher Education) institutions in the United States are stepping up their reform efforts. Schools of Education have mounted a host of initiatives such as rigorous admissions standards, specific performance-based exit data, formal partnerships with local schools, and more involvement from liberal arts faculty in the preparation of teachers (American Association of Colleges for Teacher Education [AACTE], 1991). However, in spite of these innovations and movements, many teacher education programs in the United States exist as they always have: students follow a program that takes them through courses in a variety of academic subjects, courses in educational theories, methods courses focusing on the teaching and learning of specific subject matter, a variety of field-based activities and experiences, and a capstone experience of student teaching.

In common with other developed countries, Ireland has been experiencing a period of unprecedented economic, social, technological, occupational, cultural and demographic change ([DES, 2002, p. 7](#); [OECD, 2003, p. 1.1](#)). Both Ireland and the United States are faced with the profound character of societal changes and given the many and varied demands that are placed on our students ([Cochran-Smith, 2003](#)) it would seem that a different type of teacher preparation is required.

Most reformers now agree that increasing teachers' expertise and effectiveness is critical to the success of ongoing efforts to reform education. The kind of pedagogy needed to help students to think critically, create and solve complex problems as well as to master ambitious subject matter content is much more demanding

than that needed to impart routine skills. ([Darling-Hammond, 1999, p. 221](#))

What is needed is not a rucksack-philosophy of teacher education ([Buchberger, Campos, Kallos, & Stevenson, 2000, p. 16](#)) with the assumption that the prospective teacher can be equipped once-off with the competencies that seem to be necessary to fulfil the tasks of the teaching profession over a life-long career. Teacher preparation needs to offer more than "basic training" of practical skills. Pre-service teachers need to leave the preparation program with the ability to articulate their beliefs and operate consciously in a manner reflective of their beliefs ([Barone, Blanchard, Casanova, & McGowan, 1996](#)). Education in the 21st century will require each and every individual to be ready 'to seize learning opportunities throughout life, both to broaden her or his knowledge, skills and attitudes, and to adapt to a changing, complex and interdependent world' ([UNESCO, 1996, p. 85](#)). It is therefore crucial that the range of interconnecting elements of teacher education and the teaching career are such that they help scaffold and support new entrants to the profession in a way that helps them investigate, interpret and integrate their experience as they begin to build and consolidate their teaching identity.

2. Theoretical perspective

A primary focus of teacher education programs is to facilitate student teachers in developing professional knowledge. Teacher educators have become increasingly aware that on entry to teacher education programs preservice teachers bring with them a myriad of experiences, assumptions, and beliefs about teaching and learning ([Feiman-Nemser & Remillard, 1996](#)). One of the most effective ways to help student teachers construct meaningful knowledge and understanding of teaching and learning is by first identifying these preconceptions and beliefs and then working to tease out and examine the sources and legitimacy of these beliefs ([Bullough & Gitlin, 1995](#)). As we frame the discussion that follows, we draw on research on teachers' beliefs, the role of reflective practice in examining beliefs, and propose the activity of metaphor development as a process by which to examine, critique and modify beliefs about teaching and learning. This literature frames our decision to engage in action research as a way to study the usefulness of

metaphor construction in identifying and promoting the development of preservice teachers' beliefs about teaching and learning.

2.1. *Beliefs about teaching and learning*

The attitudes held on entry to preservice programs greatly influence what prospective teachers learn and often reduce their receptiveness to the learning theories and approaches promoted in education programs (Hollingsworth, 1989; Holt-Reynolds, 1992; Korthagen, 1988; MacKinnon & Erickson, 1992). Because beliefs of teachers have been identified as primary influences on classroom practices (Nespor, 1987; Pajares, 1992) consideration of preservice teachers beliefs should be key concerns when conducting preservice teacher education courses (Richardson, 1996). As a result of this influence of beliefs on practice, a goal of teacher education is to help preservice teachers transform naïve and undeveloped beliefs into informed beliefs through identification and examination of their beliefs (Fenstermacher, 1979, 1994).

Richardson (1996) identifies teachers' beliefs as being derived from three main sources. Firstly, personal experiences of individual teachers have been shown to affect approaches to teaching, in particular experiences of community (Clandinin & Connelly, 1991) and of parenting (Bullough & Knowles, 1991). Secondly, experience with schooling and instruction influences beliefs about children's learning (Anning, 1988) and the role of teacher (Britzman, 1991), and are considered to be more powerful influences on beliefs than experiences afforded by teacher education courses (Brousseau, Book, & Byers, 1988; Feiman-Nemser, 1983; Lortie, 1975). Lastly, formal knowledge in the context of pedagogical knowledge, although not as powerful as other factors, has been found to influence teacher beliefs (Clift, 1987; Grossman, 1990). The effect, it has been suggested, may take several years to kick-in due to a 'sleepier effect' (Featherstone, 1993).

Preservice teachers have strong beliefs that learning to become a good teacher can be facilitated only through experience (Richardson-Koehler, 1988) and are very confident of their own abilities as teachers (Book & Freeman, 1986). Indeed, the attitudes and beliefs of preservice teachers have been described as 'unrealistically optimistic' (Weinstein, 1988, 1989). Preservice teachers tend to see teaching as a mechanical transfer of information (Richardson, 1996) wherein the teacher hands

knowledge to children and learning involves memorization of material (Black & Ammon, 1992).

Much of the recent research in teacher beliefs and attitudes has examined changes in beliefs at preservice and in-service levels. There is evidence to indicate that changing beliefs is an extremely difficult and challenging task. While changes in beliefs have been found to occur, and often as a result of education programs (Hollingsworth, 1989; Richardson, 1996), preservice teachers are not seen to typically develop new perspectives during teacher education courses (Stofflett & Stoddart, 1991; Zeichner & Tabachnick, 1981) unless they are confronted with their held beliefs (Tom, 1997). As Calderhead (1997) notes, becoming and staying a teacher involves complex changes and development not only in teaching behavior but also in cognition and emotion and these changes occur within powerful contexts. Perhaps the alternative to changing beliefs is to build on the beliefs that already exist (Calderhead & Robson, 1991). In this study we examine one way to do that—through metaphor development.

2.2. *Reflective practice*

A key concern in modern European teacher education is the establishment of a greater interpenetrative influence between theoretical inputs and practical teaching experience (Coolahan, 2001, p. 354). This task of balancing the theoretical and practical elements of preservice programs in an effort to better prepare teachers for the demands of the classroom is also a contentious and fundamental issue in American colleges of education (Barone et al., 1996; Howey & Zimpher, 1989). It is realized that in preservice education, where the preservice teachers main concern is to surmount immediate challenges, content from the foundation disciplines may not always achieve their full import. A variety of reflective practices may be used to add a more problem-focus to issues and to tease out the linkages that exist between theory and practice. Indeed, reflective practice may also be used to tease out linkages between theories. Argyris and Schön (1974) use the term *Espoused Theory* to describe the theories people believe their behavior is based on, these theories are known to us. *Theories-in-use* are theories that people actually use when engaging in certain behaviors, these are more likely to be unknown. Quite often a person is not aware that these theories are discrepant, however uncovering

these action theories and identifying inconsistencies between them is a difficult but necessary task. Reflective practice constitutes one means by which we can uncover the mismatch between both.

The central premise of reflective practice in teacher education is that meaning is constructed. As a goal for teacher education, it is not new. Dewey first articulated this ‘deliberation’ in 1933 when he referred to ‘the kind of thinking that consists in turning a subject over in the mind and giving it serious and consecutive consideration’ (Dewey, 1933). In the 1980s, reflective practice gathered renewed currency through the work of Cruickshank (1987), Schon (1983, 1987), Zeichner (1983), and Korthagen (1988). Schon’s work, in particular, gave a new impetus to those searching for ways to understand the practice of teaching and apply this understanding to the preparation of teaching professionals. Schon characterizes the ‘reflective practicum’ as ‘learning by doing, coaching rather than teaching and a dialog of reflection-in-action between the coach and the student’ (Schon, 1987, p. 303). Having a mechanical approach to teaching may provide preservice teachers with immediate skill, but the habits of critical reflection, open-mindedness, and willingness to accept responsibility for one’s actions and decisions will give preservice teachers the power to go on developing as teachers for the rest of their lives.

It has been necessary to devise strategies to assist student teachers in developing their reflective processes and in formulating their own personal theories of teaching and learning. Participants involved in teacher education courses are now encouraged to record their perspectives by documenting their experiences through the construction of metaphors, reflective journals, portfolios and diaries (Francis, 1995; Ghaye & Ghaye, 1998; Pollard & Tann, 1997). However, as Watson and Wilcox (2000) have suggested, it is essential that preservice teacher reflections move beyond mere ‘reconstruction of the experience’ towards an understanding of the multiple meanings immersed in educational experience. Barrow (1990) also alerts us, that while knowledge gained from experience is vital in teaching, it is highly desirable that it be also related to systematic knowledge and a strong theoretical base. Within educational contexts, metaphors play a central role in conceptualizing and reflecting upon the nature of teaching and learning, and have been used increasingly as ways to make

connections between personal beliefs and educational theories. We now examine the construction of metaphors as a valuable way of accessing preservice teachers’ beliefs.

2.3. *Teaching metaphors*

Teacher educators have been using metaphors, defined as “understanding and experiencing one kind of thing in terms of another” (Lakoff & Johnson, 1980, p. 5), as ways to support preservice teachers in examining the influence of their beliefs and assumptions about teaching and learning on their classroom practices. Metaphors have a coherence and internal consistency, which provide insights into ideas that are not explicit or consciously held. They can also be evocative, stimulating both self and others to tease out connections which might not be made use of by direct questions. Calderhead and Robson (1991) note how metaphors can help synthesize ‘quite large amounts of knowledge about teachers, children, teaching methods etc (p. 7) and help form a ‘platform’ from which practice can be understood’. Metaphors can function as tools by which a teacher gains distance from their own practice and act almost as an external observer looking upon and reflecting upon their own practice. Thus metaphors can serve to make implicit knowledge explicit through reflection on and representation of the concepts under study, and represent a vehicle and provide a language that can “bridge the gap between theory and practice” (Mostert, 1992, p. 19). Unexamined, these implicit beliefs and tacit knowledge may remain undeveloped and serve to reinforce and support classroom practices. Examination of alternative metaphors can, in addition, empower teachers to examine their own assumptions, to “explore hidden intellectual avenues contained in a metaphors frame” (Connelly, Clandinin, & He, 1997, p. 671), to reflect upon alternative practices and theoretical frameworks, and thus analyse, modify, and amend their own metaphor.

However, the use of metaphors is not always advantageous. Phillips (1996) cautions that the metaphors we hold can influence, and at times constrain, our conceptual frameworks. Our assumptions and predispositions, as reflected by our metaphors, can affect the phenomena we choose to study and the means by which we examine these phenomena. Phillips (1996) suggests that by being cognizant of our metaphors and being aware that

“metaphors are not all-encompassing and that they can be criticized or assessed” will prevent us being sucked into a “self-sustaining whirlpool” (p. 1011). Morgan (1986), drawing from his analysis of complex organizations, also highlights the limitation of metaphors when he states ‘Metaphors create insight. But they also distort. They have strengths. But they also have limitations. In creating ways of seeing, they create ways of *not* seeing. Hence there can be no single theory or metaphor that gives an all-purpose point of view.’ (p. 348). Staying mindful of these limitations of metaphor use remains a critical task of teachers and teacher educators.

Martinez, Sauleda, and Huber (2001) in an analysis of the literature on metaphors of teaching and learning categorize metaphors as falling into three main dimensions of the learning space (Greeno, Collins, & Resnick, 1996). Metaphors falling into the *behaviorist/empiricist perspective* view reflect the belief that the learner is passive and knowledge is developed by forming associations or by the subdivision of learning tasks into small and logically sequenced components. Such metaphors may refer to teachers as transmitters of information, and the learner as passive recipients. *Cognitivist/constructivist* metaphors view knowledge as actively constructed by the learner through transforming old schemata into new schemata. Metaphors reflecting such perspectives define learning as individual construction of knowledge and refer to the teacher as a facilitator and the learner as an active agent in the learning process. Metaphors arising from a *situative or socio-historical perspective* reflect the belief that learning is situated in the context in which it is constructed. Knowledge is situated, and is a by-product of the activity, context and culture in which it is used. Martinez et al. (2001) found that the minority of metaphors indicated a situative or socio-historical perspective on teaching and learning. In their own study of 50 experienced primary teachers’ metaphorical representations, Martinez et al., found that behaviorist/empiricist metaphors to be most common (representing 57% of the metaphors) and constructivist metaphors less common (38%), with 5% of teachers constructed situative metaphors of teaching and learning. Their study of a contrast population of prospective teachers found constructivist metaphors to be more prevalent with this population (56%) as were situative metaphors (22%), and behaviorist metaphors less prevalent (22%). The authors comment that on differences in prospective and experienced

teachers metaphors of teaching as being ‘highly relevant for teacher education’ (p. 973) and suggest that ‘An investigation of how metaphorical representations may be changed by these reflective and analytic experiences...be taken into account. The collection and the reconstruction of metaphors should not be limited to one short data collection period, but extended to an entire academic year.’ (p. 974).

3. Purpose of the study

This paper reports on our efforts (a) to engage preservice teachers in communicating beliefs about teaching and learning through construction of personal metaphors, and (b) to support the continued evolution and modification of metaphors so that they embody and reflect principles of teaching and learning revealed in structured academic experiences and during field placements experiences.

Our intent is not to engage in a comparative analysis of American and European contexts. The many differences (social, cultural, economic, political) between the contexts make qualitative comparisons of preservice teachers’ beliefs of little practical purpose. Our intent is to examine the influence of experiences designed to meet the local and national needs of both programs on the evolution of beliefs as communicated through metaphors. Thus we examine the changes in preservice teachers’ beliefs about teaching and learning that come about as a result of engaging in the normal activities associated with the education program in their respective institutions. We believe that examination of practices in both settings could support us, as teacher educators, in learning more about the influence of formative experiences of preservice teachers on their beliefs about teaching and learning as expressed through metaphors. Furthermore, we hoped to gain valuable insight into the ways in which we can support the development and evolution of beliefs. In the following section we identify and chart preservice teachers’ metaphorical representations of teaching, and explore factors influencing metaphorical change.

4. Methodology

4.1. Participants and program experiences

There were 124 participants distributed across both research sites. The mean age of participants

was 18.7, 86% were female and the remainder was male.

Irish participants were preservice teachers enrolled in their first year of study in an elementary education program. In the first semester parallel courses in educational methodology and micro-teaching aim to introduce preservice teachers to a range of essential teaching skills and to facilitate the acquisition of these skills through observation, practice, peer-review and self-evaluation. Using videotaped recordings, preservice teachers are asked to plan, prepare, teach, reflect on and analyse a number of lessons and lesson segments. Each preservice teacher has the opportunity to teach a small group of children in a studio setting with the support of a tutor, a critical friend and a collaborative group. Other reflective activities involve metaphor construction, and reflective journals. In the second semester, the preservice teacher, with a partner, teaches the full range of curricular subjects to an elementary class for one day each week for 10-weeks. This practice is designed to provide the opportunity for reflection and performance review. Preservice teachers are required to keep a reflective portfolio through their teaching practice placement; this functions as a structured medium wherein they can reflect on their practice and experience in elementary classrooms. Parallel courses in educational methodology occur at the same time as the teaching placement.

American preservice teachers were enrolled in the first semester of their elementary education degree program. Participants were enrolled in a course examining principles and methods of teaching. This course emphasizes teaching strategies, principles of effective instruction, classroom management, and procedures for planning and evaluating instruction

in elementary schools. Table 1 outlines the university and field-based experiences participants' engaged in during the year in addition to instrument administration and reflective practice experiences and associated timelines.

4.2. Metaphor construction and supporting reflective activities

Participants were engaged in a variety of activities designed to support them in reflecting upon their changing beliefs about teaching and learning and in turn support the metaphor construction activity of, work carried out by Horgan and Bonfield (2000) (see Table 1). At the beginning of the study all participants were asked to construct their *metaphors* of teaching (Appendix A) to enable them to reflect upon and identify their beliefs about the teaching and learning. Participants were instructed that their metaphors be detailed enough to incorporate reference to the teacher and the learner in the context of engaging in the activity of teaching/learning. Participants were asked to provide an updated metaphor of teaching and learning (Appendix B), were required to indicate if the updated metaphor consisted of a modified or completely new metaphor, and were asked to compare and contrast their initial and updated metaphor. Focus group discussions (semester 1 microteaching experience in the Irish study) and metaphor presentations (semester 1 methodology course in the American study) engaged participants in the communication of their metaphors of teaching and learning and re-examination of metaphors taking into consideration their university experiences.

Irish students engaged in two *focus group* discussions. The first focus group convened early in the

Table 1
Programmatic experiences, instruments and opportunities for reflection

Irish context		American context	
Program experiences	Opportunities for reflective activity	Program experiences	Opportunities for reflective activity
Educational methodology course	Initial metaphor activity	Principles and Methods of Teaching Course	Initial metaphor activity
	Reflective journal		Reflective journal
Microteaching experiences 10 week school-based practicum	Microteaching analysis		Metaphor presentations
	Focus group		Final metaphor activity
	Reflective portfolio		
	Final metaphor activity		

semester, the purpose of this session was to provide the opportunity to share metaphors and provide feedback on the metaphors of others. Students were instructed to (a) describe their metaphor, (b) indicate experiences or factors that influenced their metaphor construction, and (c) identify how the metaphor addressed aspects of teaching and learning. In the second focus group, which occurred during two thirds of the way through the semester, students were placed in the same groups and required to (a) provide an update on their metaphor, and (b) identify factors which influenced modification to or changes in their metaphor. Students then brainstormed on factors that influence teaching and learning (e.g. assessment, classroom management, teacher knowledge) and listed these factors on a chart sheet. They then revisited their metaphors and identified factors which were not addressed by their metaphors. Students then individually reported on these factors to their peers and received feedback on the ways in which their metaphors could be expanded to incorporate these elements. A student in each group was elected to record the main highlights of discussion in their group.

American students were required to *present their metaphors* to their peers and instructors for questions and comments. Presentations occurred weekly with approximately two students presenting each week. Students were advised that the presentation should consist of an 8–10 min seminar outlining the components of their metaphor. When making their presentation, they were required to: (a) incorporate reference to how their initial metaphor represented both teaching and learning, (b) comment on development and modification of their metaphor since its initial construction, and (c) mention the factors influencing their initial metaphor construction, and factors influencing any subsequent modifications to their metaphor. The format of the presentation was open. Students were encouraged to make use of the facilities provided (i.e. white board, overhead projector, and computer) and other resources that they felt would provide their audience with access to their metaphorical representation(s). Students were also required to submit a written report on their metaphor to the instructor outlining the elements they planned to address in their presentation. This repeating process of metaphor presentation and refinement over the course of the semester provided a focused and iterative emphasis on metaphor development. Student feedback was structured to be supportive and facilitate peers in

addressing components of instruction (such as assessment, for example) that were not incorporated in the metaphors.

4.3. *Design of study*

Action research (Rearick & Feldman, 1999) was the methodological approach used in the study. At both sites the researchers taught the core academic experience during the semester of initial metaphor construction. This methodological frame supported reflective inquiry into our own classroom instruction, more specifically supporting us in collecting data that informed the development of instructional practices and the situations in which the practices are carried out.

Our conceptualization of action research principles stems from Rapoport's definition of its aims as contributing to 'both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework' (Susman & Evere, 1978, p. 587). Generally, the research process can be seen as a spiral of action research cycles consisting of phases of diagnosing, action planning, taking action, evaluating, and specifying learning (Susman, 1983). We consider this study the first cycle. Identification of the problem stemmed from the shared observation of the researchers that preservice teachers had little time to reflect upon, integrate, and critique their own beliefs on entry to programs and to reflect upon the structured experiences (both academic and practical) of their teacher education program. A more detailed diagnosis of the problem was undertaken by a comprehensive review of the literature relating to teacher beliefs and reflective practice; this literature review process was also used to generate possible solutions to the problem through examination of the reflective practice of metaphor construction. A plan of action was then designed; this involved the incorporation of metaphors construction activities and the concurrent incorporation of reflective activities in the form of focus group discussions, metaphor presentations, and journaling. The plan of action was implemented at two sites and data collected on the outcomes.

4.4. *Data collection*

Initial data on the Irish preservice teachers were collected during a semester long microteaching

course taught by one of the authors of the paper. It was in the microteaching context that participants were engaged in metaphor construction, weekly reflective journals, two focus group discussions, and visiting and revisiting beliefs about teaching and learning in light of structured microteaching experiences. In the second semester Irish participants engaged in a semester long teaching practicum, participants completed the updated metaphor assignment after the completion of the practicum. Initial data on the American preservice teachers were collected during a semester long course on principles and methods of teaching taught by one of the authors of the study. During this semester, participants engaged in the construction of personal metaphors, metaphor presentations, journaling activities, analysis of changing beliefs about teaching and learning, and in metaphor development and modification. The updated metaphor activity was carried out following the university-based academic experiences. A timeline of metaphor administration in relation to academic and field experiences is presented in Fig. 1.

4.5. Data analysis

Analysis of the metaphors proceeded in a manner consistent with a naturalistic inquiry approach (Lincoln & Guba, 1985). Open coding (Strauss, 1987) was used to infer categories of beliefs from responses on each metaphor, through examination of all aspects of the participants' response on each of the metaphor activities. Following the coding of

an individual metaphor the codes were examined for coherence to a particular pedagogical philosophy and the metaphor was assigned to one of the three categorizations formulated by Martinez et al.: behaviorist/empiricist, cognitivist/constructivist, and situative or socio-historical perspective. Accuracy of coding was established by selecting a sample of 25 metaphors at both sites. Researchers individually coded and categorized the selection of manuscripts and compared the results. Divergence occurred in the classification of several metaphors, which were then re-examined, and consensus reached on the appropriate categorization. In several cases where consensus was not reached students were asked to provide further clarification of their metaphor. Several metaphors did not fall into any of the three categorizations and were classified as 'self referential'. In addition, several of the metaphors similar to those found in the Martinez study were categorized differently in this study. Following the joint coding activity, the remaining metaphor responses were distributed amongst the researchers to code according to the predetermined categorization. The penultimate step in the analysis of the data involved the isolation and validation of the major categorizations wherever they appeared in the data by triangulation across the various data sources and across time. Thus, validity of the categorizations was tested by (a) individual researchers reviewing the responses, (b) comparing the categorizations for individual participants with additional data through triangulation with other data sources (transcripts from focus group discussions, for example), and (c) seeking confirming as well as disconfirming evidence for individual categorizations. Lastly, these categorizations were used when analysing the remainder of the data (focus group discussions, journal entries) while at the same time remaining open to the emergence of additional themes.

5. Results

5.1. Initial metaphorical representations of teaching

In analyzing the metaphors constructed at the beginning of the year within the framework presented by Martinez et al. (2001), 49% of participants were found to hold behaviorist metaphors, 24% constructivist metaphors, 9% situative metaphors, and 18% presented metaphors categorized as exclusively self-referential (see Fig. 2).

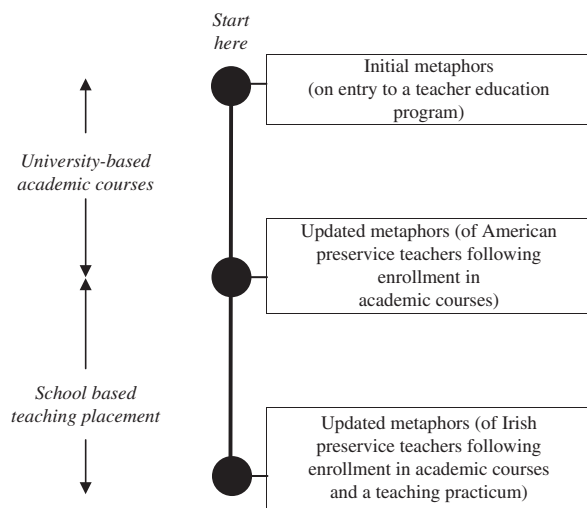


Fig. 1. Study timeline.

Examination of metaphor classification by institution (Table 2) indicates the prevalence of behaviorist metaphors in conceptualizations of teaching and learning despite the different institutional and national contexts. Constructivist metaphors were more prevalent at the Irish institution and self-referential metaphors (discussed at the end of this section) at the American institution. Situative metaphors accounted for a relatively small proportion of metaphors at both institutions.

The majority of preservice teachers interpreted teaching and learning from the *behaviorist/empiricist* perspective i.e. as a process of individual growth through the acquisition of knowledge in the form of new associations. The metaphors constructed by participants described the teacher's role as a transmitter of skills (for example, someone perfecting their golf swing, someone working out at a gym, a skilled weaver working the loom), knowledge as an externally determined product (examples are, baking a cake with the right ingredients, a Gillette Mach razor blade), and the learner as a mere recipient of knowledge, a sort of empty slate or container (e.g. a sculptor sculpting a block of stone, an artist with his palette of vibrant colours). The behaviorist metaphor presented in Table 3 was classified as teacher as transmitter of skills. Fewer metaphors (24%) could be attributed to the *cognitivist/constructivist* domain. The constructivist metaphors referred to notions of organization and elaboration of knowledge by students, to their active role in restructuring experiences and achiev-

ing conceptual coherence, to the understanding of theories and concepts, and to the development of general skills, intrinsic motivation and transfer (Martinez et al., 2001). Here the teacher is conceived of as a facilitator and coach (a good pair of walking boots that are there to support the feet), and the student is conceived of as a constructor of knowledge rather than passive recipient (a bird learning to fly from the nest). Other examples from our data are 'a fire in which the teacher provides the spark', and 'good chocolate cake that makes you want more'. The example in Table 3 was classified as constructivist because the teacher was seen as supporting the students in building understanding, in this example the teacher provides important elements in the learning process but the students are ultimately responsible for constructing understanding. A relatively small proportion (9%) of participants expressed a socio-historical notion or situative understanding of learning in a coherent metaphor. Central to this view is that knowledge is created and made meaningful by the context and activities through which it is acquired (Prestine & LeGrand, 1991, p. 62). Examples that emerged from our data were 'being surprised by life when you don't know what is in store', and 'a cygnet that grows into a swan and is comfortable in its environment of the river'. The example of the traveler and the North Star, provided in Table 3, exemplifies this notion of student creating knowledge; this creation of knowledge is supported and enabled by the context itself.

Initial analysis of the Irish metaphors revealed a category of metaphors that we defined as 'other', as they did not fit the classification scheme of Martinez et al. Several months later, on analyzing the American preservice teachers' metaphors a similar category of responses emerged. We realized that all these metaphors had a common theme. We then revisited the Irish metaphors to confirm our hypotheses and concluded that the majority of metaphors falling within this category were self-referential. For these preservice teachers, their descriptions of the act of teaching did not refer to students. Neither did they refer to classrooms,

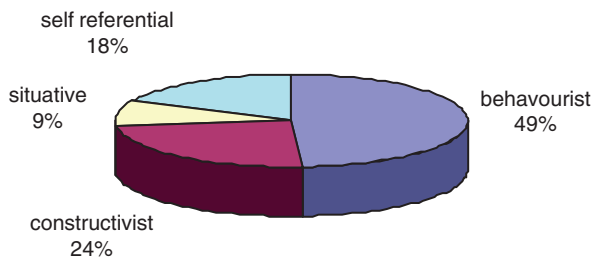


Fig. 2. Classification of metaphors across institutions at the beginning of the study.

Table 2
Metaphor classification by institution

	Behaviorist (%)	Constructivist (%)	Situative (%)	Self-referential (%)
Irish preservice teachers	52	31	12	5
American preservice teachers	47	17	7	30

Table 3
Examples of initial metaphors constructed at the beginning of the study

Type ^a	Initial metaphors
B	Teaching and learning is like a thunderstorm. The teacher is the cloud filled with knowledge. The teacher's instruction consists of the rain falling onto the students, who are the earth below. The students' learning is represented by the absorption of water, as they soak in the instruction that is presented. Some days, more rain is necessary, perhaps because the topic is new and challenging for students. There are days when flooding occurs, and this is usually when the teacher has overloaded the students with data and the children cannot handle the amount of rain coming down. The teacher just needs to figure out how much rain is enough on any given day, and decide for some students whether to rain more gently while others are more able for a greater torrent. Rain is good—it is nutritious.
C	Teaching and learning is like building sandcastles on the beach. The teacher is the ocean waves and the ocean, the content is the sand, and the students are the children on the beach. Children are building sandcastles but they need the ocean and its waves to help the construction of it. While some waves may knock the sandcastle down, but most help wet the sand so that children can build the castle bigger and higher (knowledge). Teachers try to keep the kids under control and understand each child individually. So the beach tries to pull kids near to the water because if you are too far from the waves or the teaching then the less chance there is to build the sandcastle or grasp the content. Teachers, as the waves, have to go towards the kids and wet their sand, reach them, and motivate them. It is then up to the kids to make sandcastles and keep trying to make strong and big castles.
S	A teacher is like the north star that guides the explorer. The teacher guides students, but also lets them use their own thinking to discover 'new lands' of their own. Many times the teacher provides a compass and has a plan in her mind for the direction and the journey that the student may take. Sometimes, however, the student gets immersed in the journey and sees opportunities for directions and sojourns that the teacher had not anticipated. The student often follows these unexpected twists and turns in the journey and the north star (teacher) remains in the background providing light, direction, and support when needed.
S-R	A good teacher is like a candle—it consumes itself to light the way for others. A good teacher doesn't simply exist, she puts forth 110% effort all of the time. She devotes herself to teaching other, and is willing to do some work outside of school. To me, a good teacher often puts her profession and her students ahead of her social life. I think a good teachers knows they were put on this earth to teach.

^aB: behaviorist; C: constructivist; S: situative; S-R: self-referential.

instructional materials, or assessment, thus accounting for our difficulty categorizing the metaphors. These metaphors were egocentric and focused on what teaching represented for them as individuals (e.g. 'teaching is like running a marathon; you train, sweat, and prepare for this great race but once you're in it, you just keep going strong until the end') and did not refer to components that we would consider central to the practice of teaching. The example provided in Table 3 is an illustration of the focus on self when constructing a metaphor and reveals how this focus may result in the neglect of other components central to the activity of teaching and learning (for example, students).

5.2. Changes in metaphorical representations

Examination of the classification of metaphors at the end of the study indicates a small drop in the number of behaviorist, situative and self-referential metaphors and a sharp increase in the proportion of metaphors classified as constructivist (see Fig. 3). Examination of the data by site (see Table 4), however, indicates that metaphors of the Irish

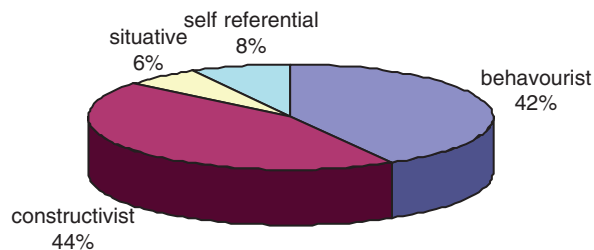


Fig. 3. Classification of metaphors at end of the study.

cohort were more resistant to change than metaphors of their American counterparts. In particular, within the Irish group behaviorist metaphors remained dominant and there was a rise in the number of constructive metaphors. Examination of the American data shows more fluidity in that behaviorist metaphors were less prevalent at the end of the study than constructivist metaphors. Most evident in the American data is the almost three-fold increase in the number of constructivist metaphors. Another visible contrast between both sites was the absence of self-referential metaphors in the Irish group, a category which represented

Table 4
Metaphor classification by institution

	Behaviorist (%)	Constructivist (%)	Situative (%)	Other (%)
Irish preservice teachers	50	41	9	0
US preservice teachers	33	47	3	17

almost one fifth of American metaphors at the end of the study.

Overall, the proportion of metaphors reflecting *constructivist* views of teaching and learning increased considerably from 24% to 44% largely as a result of the change in American preservice teachers' metaphors. A number of factors may have influenced this increase. An influential factor in both contexts may be exposure to constructivist principles in methodology courses and in curriculum frameworks in both countries. Another reason may be the growing awareness of the central role played by the child in the classroom as a result of field based experiences, as reflected in Irish participants' journals and focus group discussions. As one participant stated 'I see now that before I student taught I never thought about having to help children learn and understand the material, I sort of thought that learning happened automatically. Now I see that one of the biggest jobs of a teacher is setting up things...or learning experiences that help a kid make their own sense of things'.

While, the proportion of *behaviorist* metaphors held at the end of the year was less than constructivist metaphors, the enduring presence of the behaviorist metaphor (representing 42% of all metaphors) is not altogether surprising for a number of reasons. Firstly, the role of the teacher is more predominant in the behaviorist view. As novice teachers starting out in first year with a myriad of methodologies, concepts and apprehensions to integrate, it is natural that students would focus more on themselves as a teacher. Secondly, the participants have graduated from approximately 13 years in school in an 'apprenticeship of observation' (Lortie, 1975) themselves, and are coming to college with beliefs about what constitutes teaching and learning. For preservice teachers, this filtering of prior experience will determine how their third-level experiences will be interpreted. In many first and second level education contexts, the child/student is portrayed as digesting information and passive in his/her own learning. Perhaps when placed in the complex and somewhat intimidating

classroom situation students revert to 'how they were taught'. This may account for the stability of the behaviorist philosophy in Irish preservice teachers' metaphors in particular, as they had one semester of teaching experiences. Thirdly, the institutional context plays a two-fold role which cannot be ignored (Francis, 1995, p. 239). In the Irish context, the prevalence of behaviorist metaphors may be a comment on, and somewhat reflective of, methods of teaching that are modeled in teacher education institutes. The large increase in student numbers have resulted in as many as 100 and 200 students in some methodology courses leading to a greater dependence on behaviorist style lecture approaches, as compared to considerably smaller numbers (approximately 25) in the American context. As can be seen from the example presented on Table 5, metaphors classified as behaviorist at the end of the study differed from initial behaviorist metaphors in the degree to which they addressed multiple aspects of the teaching-learning environment, resulting in more detailed and elaborate metaphors.

One pattern common across both sites was the decrease in metaphors classified as *situative*. Examination of reflective portfolio's and metaphor responses indicated that several Irish participants found the teaching situation more complex than their initial somewhat idealistic notions of teaching. As one participant stated, 'teaching is not the fairytale I believed it was.' Participants found themselves ill-equipped to deal with the unpredictable and dynamic realism of the classroom, and may have reverted to behaviorist methods of teaching which attribute greater control to the teacher. Despite receiving much information on socio-historic points of view throughout their university based academic experiences e.g. Habermas' construct of an ideal community of dialog, these perspectives did not filter through into the students' operational knowledge and practice.

We found evidence of a decrease in self-referential metaphors across sites; however they represented a larger proportion of metaphors at the American site than at the Irish site. The absence of a field experience in the American experience may account

Table 5
Examples of final metaphors constructed at the end of the study

Type ^a	Final metaphors
B	Teaching is like cooking. Cooking is undeniably a very active discipline. ‘Teaching is like cooking’ effectively captures what I’ve come to believe about teaching. As teachers it is okay—good even—to pick bits and pieces of different ‘teaching styles’ to find the perfect fit for the understanding that you’re trying to get the students to reach. Cooking, with its myriad of styles, is a natural parallel to this sentiment. Another element of the metaphor .. is the idea of being responsive: when cooking, like when teaching, you first have to consider who you’re cooking (teaching) for. What special requirements do they have? What would they like? Cooking also requires being proactive: you also have to decide ahead of time what you’re cooking (what you want students to understand)—and there might very well be many different ways of doing it (teaching it). Also like teaching, cooking can be adapted along the way—if, in the middle of cooking something, the cook finds something is lacking or slightly amiss, the cook can adjust. This is the assessment part—assessment is that constant checking of the meal in progress—does it need something extra (like salt)? something different than usual (an exotic herb, or a new manipulative to illustrate what you are trying to teach)? or a longer amount of time in the oven (maybe an extra day to practice the new skill/procedure/concept)? It can also capture the concept of learning. If the teacher is the cook, and cooking is teaching, then I figure learning is eating. If the teacher has put in the right amount of each ingredient, cooked it at the correct temperature, for the appropriate amount of time, then the meal should be nutritious and delicious (presenting good content, in a good way, that is hopefully enjoyable for students).
C	Teaching is like preparing a hip hop dancer to perform the basic and expected skills required of dancing with the associated and critical expectation that your dancer engage in a great deal of improvisation. The trainer is the teacher and the dancer is the student. The different steps that the trainer explicitly coaches the dancer in are fundamental skills necessary to dance (steps, body positions, rhythm). Drills, practice and conditioning exercises help the dancer become stronger and more flexible and perform the moves that they know how to do. But the teacher, while an important person in the practice of dance, isn’t responsible for everything. The dancer ultimately has to perform on their own and take over responsibility for the art of dance. For example, a dancer can have a wonderful trainer, but if the dancer doesn’t put forth the effort to learn, the dancer will not be successful. What is really important though is that the dancer puts together these steps and basic skills and tries to make them work and fit together. The result of this is a new routine, a new technique, a new understanding of how dance elements fit and work together. This requires that the dancer work hard on making sense of the elements the trainer presents and that the trainer support the dancer in constructing dance elements and routines that are coherent and make sense. Assessment is the performance at the end, but also evaluation of the work that leads to the performance, looking for ways to support the dancer along the way.
S	Teaching is like stuffing a knapsack on a camping trip. Students bring to the classroom their prior knowledge and experiences and then the teacher guides the way, helping students to discover new things on the way. The compass inside points you in the right direction, just as teachers try to do the same with their students. Along the trail, you pick up new things such as flowers or branches that you think are interesting, just like students do when they find something that is new, exciting or interesting to them. Teachers often start off guiding the way but students can decide their own journey and their own direction. The direction is decided often as a result of different prospects students see while out exploring, and routes that seem interesting—so sometimes the students become the guide of sorts.
S-R	Training is like running hurdles. Sometimes you are on flat ground where all is smooth and sometimes you’re up, jumping over the next challenge in front of you! The flat times are when you are well prepared and things go well, like students understand the material and pay attention. Other times the race and the route is arduous and takes lots of energy and commitment. Obstacles might be students having difficulty understanding, poor assessment grades, district mandates that require time and energy, and other unexpected events that arise in the day-to-day life and work of a teacher. A teacher learns to be tough and skillful, and not to be dismayed when things don’t go well. Some teachers leave the profession when jumping these uphill hurdles, but for some if they can keep momentum and focus on hurdle by hurdle, they soon get back to flat ground and things are easier for a while.

^aB: Behaviorist; C: constructivist; S: situative; S-R: self-referential.

for the persistence of self-referential metaphors; these participants did not have the opportunity to draw on experiences of teaching when developing and modifying metaphors. Thus the focus may have remained on what teaching means for them personally. For many American preservice teachers who constructed and maintained self-referential metaphors, their metaphors underwent significant changes and modification over the course of the semester. Despite these changes the new metaphors

did not reflect a significant shift in perspective. For example, the focus on self is evident in one student’s shift from initial metaphor (‘Teaching is like breathing it is life long process where you are always learning how to be better at it’) to the final metaphor (‘Teaching is being an inventor who works to positively impact the present and future condition of humanity’). The example presented in Table 5 illustrates the continual focus on the personal struggle of the teacher, this metaphor keeps the

teacher center stage, but does make reference to other essential elements in teaching although situates these elements in the background. In contrast, the classroom teaching experiences of Irish participants may have shifted the focus from self to the learner and the act of teaching. The overall decrease in self-referential metaphors indicates that, for a number of participants, first year experiences succeeded in shifting the focus from self to an awareness of the other factors involved in the teaching equation.

From an action research perspective, we were interested in how students viewed the activity of metaphor construction. Analysis of responses on the final metaphor task, which had a component specifically dedicated to the activity of metaphor construction, revealed three main themes. A common theme that emerged was how metaphor construction compelled students to reveal their true beliefs about teaching and learning. As one student stated 'I think the metaphor activity helps prevent people from hiding behind what they think they are supposed to say.' Another student contrasted metaphor construction with other activities in her comment 'I have written at least 4 philosophies of education during my college career, but have always felt I was giving "lip service" to my professors and using specific jargon and terminology. This metaphor construction was different. I felt there was freedom to pick the points important to me personally without feeling pressure to "say" the right thing.' Another theme was how the activity helped students consider the multiple components of teaching and learning. As one student stated 'The metaphor construction aided my thinking about teaching and learning by allowing me to see my weak understanding while simultaneously building foundational ideas that I had never considered.' The third theme to emerge was how the activity helped students think about the relationship between teaching and learning. Students commented that 'The metaphor helped me get a better handle on all the components and aspects of teaching and learning' and 'I hadn't thought about how teaching influences learning but having to think hard about my metaphor was really helpful on making these links between teaching and learning'.

6. Discussion

Examination of the metaphors constructed at the beginning of the study revealed that almost half of preservice teachers possessed predominantly beha-

violist notions of teaching and learning. This finding supported previous research indicating an initial focus on teaching as a mechanical transfer of information (Richardson, 1996), which leads participants to demonstrate a somewhat, naïve optimism regarding the simplicity of teaching (Weinstein, 1988, 1989), something that students themselves commented upon. A relatively large proportion of preservice teachers in our study did, however, possess initial beliefs that reflect constructivist theories of education, a proportion considered large given their low level of exposure to explicit educational theories. Also noticeable was the initial absence of reference to the learner in metaphors, and a corresponding emphasis on their own personal journeys as indicated by the prevalence of self-referential metaphors. This constituted the construction of a new category of metaphor that was not present in the original Martinez et al. study. Two reasons may account for the emergence of a new category of metaphor in our study. Firstly, over half of the teachers in the Martinez study were experienced teachers and as our data indicated self-referential metaphors largely present in the metaphors of those with no teaching experience it is not surprising they did not appear in the Martinez study. Secondly, in the Martinez study participants were explicitly asked to reflect on their understandings of learning prior to metaphor construction, this may have drawn attention from self and may account for the non-emergence of self referential metaphors.

In the initial stages of teacher education it is natural for preservice teachers to focus on survival rather than on their developing ontology's and epistemologies. The low increase in constructivist metaphors in the Irish cohort and the predominance of self referential metaphors in the American group over the course of the first year was disappointing, although not surprising, given the research which identifies the difficulty in changing beliefs (Stofflett & Stoddart, 1991; Zeichner & Tabachnick, 1981). Given that American preservice teachers did demonstrate significant change in the proportion of constructivist metaphors relative to behaviorist metaphors, this study indicates the potential for teacher education courses to challenge and bring about change in preservice teachers beliefs.

An argument may be made that qualitative differences in the experiences afforded to preservice teachers influenced metaphor construction thereby accounting for differences across institutions. American

data show the influence of structured academic experiences on challenging beliefs about teaching and learning and motivating the construction of constructivist-type metaphors. In contrast, the Irish data indicate how the focus on behaviorist views of teaching and learning was maintained during teaching placement. This leads us to question whether the gains made in structured academic experiences are masked as a result of factors associated with teaching placement. Analysis of the findings of the Martinez study provides some support for this hypothesis. In the Martinez study, behaviorist philosophies were more prevalent in experienced teachers' metaphors than in preservice teachers' metaphors. This indicates that the dominance of behaviorist metaphors in the Irish cohort in our study may be associated in some way with their classroom experience.

The relatively small change in Irish preservice teachers' metaphors may be due to a number of factors. For many of the Irish metaphors, even though there was not a change in categorization, there was modification (significant in some cases) of metaphors to reflect the experiences over the course of the study. New metaphors were more detailed and complex referring to additional facets of teaching—however in many cases the modified metaphors resulted in the provision of greater detail and a correspondingly broader conceptualization of the tasks of teaching rather than resulting in a substantial change in philosophy. One possibility is that the concept of metaphor was not sufficiently developed, integrated or understood or students were not afforded adequate time for reflection to accommodate their experiences. A more collaborative structured approach is essential in helping preservice teachers deconstruct their metaphors hopefully resulting in a move from superficial analysis to meaningful reflection on events. Another possibility, and one that merits further study, is the conjecture that exposure to academic courses may have brought about changes similar to those in the American sample, however the subsequent engagement in teaching practice and experience of the complexities of classroom teaching caused preservice teachers to revert back to behaviorist notions of teaching.

We believe that the Irish preservice teachers in our study may not have had the luxury of time and space to reflect on the information presented in lectures and to integrate this with the events occurring in the classroom. Thus they need to be

provided with the opportunity to reflect on how concepts presented in lectures relate to realities of the classroom. This phenomenon is known as the 'sleeper effect' (Featherstone, 1993) and merits further study within the context of preservice teacher education. Reflective practices have the potential to provide the link that will bridge the ever-widening gap between the theory and practice of professional preparation. Activities must be cultivated that connect the knowing and reflection-in-action of competent practitioners to the theories and techniques taught as professional knowledge in academic courses. This will also involve university faculty modeling a reflective process in which questions and inconsistencies can often be more important than answers locked into consistent rules and customary ways of thinking.

7. Conclusion

Britzman (1989) makes a strong case for hearing the 'voices' of preservice teachers in an effort to understand the process of teaching and learning from their perspective. In this study we have attempted to do just that. Through this venture into the process of personal theory building through metaphor construction, we have discovered that metaphor construction is a valuable activity for understanding preservice teachers' practical knowledge. Metaphors may hold an important key to assisting student teachers to understand themselves as teachers and for relating this understanding to their own practice. Through exploring their images of teaching, they may be assisted to reflect critically on the teaching decisions they make and monitor their own development and growth as teachers. Teacher educators can no longer only be concerned with imparting knowledge about teaching, rather, teacher education must provide avenues for student teachers to understand the values, attitudes and beliefs that they bring to preservice teacher education and then to plot and monitor their own professional growth. Images and metaphors of teaching have the potential to provide the language of practice for student teachers and teacher educators to engage in collaborative dialog to achieve these avenues.

Appendix A. Initial Metaphor construction task

Constructing your metaphor of teaching and learning is an important component of this course.

By constructing a metaphor, you can make implicit knowledge explicit through reflection on and representation of the concepts related to teaching and learning. What the metaphor construction task will do is help you reflect upon and identify your beliefs about teaching and learning at the beginning of the course. Unexamined, our implicit beliefs and tacit knowledge may remain undeveloped and serve to reinforce and support classroom practices. This is a good thing if our beliefs are sophisticated and informed by current theories and authentic experiences. Thus, it is envisioned that your metaphors will evolve and develop over the course of the semester.

Examination of alternative metaphors can empower you as a teacher to examine your own assumptions. Thus, you will be responsible over the course of the semester for presenting your metaphor to the (focus) group, the (focus) group responsible for providing feedback on your metaphor.

Your metaphor should be detailed enough to incorporate reference to the teacher and the learner in the education context.

Appendix B. End of year metaphor construction task

Metaphor construction can be a power tool to help us identify our beliefs and assumptions about teaching and learning. In particular, engaging in metaphor development requires us to identify elements we may not have considered during our initial metaphor construction. Addressing these elements (for example, assessment) and incorporating them into our metaphors causes us to reflect upon what we believe to be essential components of teaching and learning and the role that both teachers and learners play in relation to those components.

As part of your metaphor update assignment, please address the following components:

Section A: Provide an updated metaphor of teaching and learning.

This updated metaphor should be sufficient in detail that it addresses many of the components of classroom learning and teaching that we have discussed in the course so far.

Section B: Compare and contrast your initial and updated metaphor.

Indicate if your metaphor consists of a modified and more detailed version of your initial metaphor (*case a*), or if your metaphor is a completely new metaphor (*case b*).

In the case of (a)

- If your metaphor consists of a modified and more detailed version of your initial metaphor, then *list* the newly incorporated elements.
- For each new element, provide an *explanation* of why it was not incorporated in the original metaphor (perhaps it never occurred to you, or perhaps you didn't think it was important, and so on).
- Was there anything that you found difficult to incorporate in your metaphor? Why?

In the case of (b)

- If your metaphor is a completely new metaphor, please explain why you decided that your *original metaphor* was not adequate.
- Discuss how your *new metaphor* better addresses teaching and learning, in relation to your previous metaphor. You can do this by *listing* the individual elements incorporated in your metaphor.
- Was there anything that you found difficult to incorporate in your metaphor? Why?

Section C: Metaphor construction as an activity. Please address the following questions:

- How useful was metaphor construction in helping you clarify your thinking about teaching and learning?
- What factors most influenced the changes, if any, in your metaphor at the end of the year?

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