Reflective practice is considered an important goal in teacher preparation programs (Rogers, 2002). There are a variety of perspectives on how to identify, document and analyze this activity. Reflective practice in teacher education is generally characterized as the ways in which teachers critically interrogate their teaching and learning how to teach and as an outcome of this interrogation consider how they might refine and improve their practice (Lyons, 1998). Fedler (2003) uses a genealogical lens to trace the different traditions that have coalesced to influence meanings and referents of reflective practice in teacher education. While appropriate approaches to reflective practice include assumptions that reflectivity should provide warrants and evidence for beliefs (Dewey, 1933) and a means to gain professional knowledge (Schön, 1983), theoretical referents for reflective practice continue to exist as a way for teachers to gain professional knowledge and the capacity to assert a deeper conceptual layer of analysis gained from their experiences. Van Manen (1981) conceptualized reflective practice as a way of thinking about coming to decisions involving alternative courses of action linked to social justice.
As such, occurring and anticipatory differences in professional practice and the simultaneous flux of participation establish the context and experiential basis for this interpretive capacity of reflective practice. However, some of the ideas used to characterize reflective practice arise from the interplay of interpreting knowledge derived from experience and the embodiment of that knowledge that warrants professional renewal within a community of practice. The crisis of re-representing the immediate and long-term interpretations and designations of growth (increased competency and renewal) within the domain of reflective practice is still formidable. From our current perspective, the educative value derived from reflective practice is not a static constituent of what has been experienced and observed. Reflective practice facilitates different lenses to explore and explain catalytic capacities to grow (and assert growth) in and across levels of competencies in a manner that communicates understanding and overlapping temporal and professional continuities.

While some teacher educators offer a deterministic model to describe the process of reflective practice (see Korthagen, & Kessels’s, 1999 five cyclical phases of reflection), we agree with Fendler (2003) that the schematic stewardship of reflection is not so neat. Once teachers decide to (and are guided to) build on salient professional experiences with sensibilities they come to know as reflective practice, they are more likely to make their trajectory of ideas about teaching and learning visible and available to both collaboration and revision. Accordingly, Davis (2006) and other researchers (Zeichner, & Liston, 1996) have characterized reflection as productive and unproductive, or as strong or weak. The factor that is instrumental in distinguishing between these types of reflections is that strong reflection is supported by evidence for claims that allows teachers to generate alternatives to their decisions or question their assumptions (Richards, & Lockhart, 1994; Farrell, 2007; Davis, 2006). In this research, ePortfolios provide a forum for reflecting on teaching and learning. We conceptualize purposeful reflective practice in ePortfolios as comprised of three critical factors: (1) selection and presentation of baseline and post-baseline evidence; (2) application of a conceptual framework; and (3) articulation of growth. In this way, ePortfolio entries are viewed as gross reflections, such that the entry’s evidence, conceptual framework and articulation of growth represent teachers’ reflective practice. As mentioned above, a key aspect of our conceptual framework concerns how growth within the domain of reflective practice is depicted in the ePortfolio. We address this issue in the next section.

Conception of Growth
One of the primary purposes of constructing science teacher ePortfolios is to show authentic professional growth articulated in the process of re/creating goals and purposes associated with practices and outcomes over time. Employing authentic growth as an analytic category within the creation of science teachers’ ePortfolios entails exploring and recognizing purposeful attempts to interpret transformative experiences associated with teaching science. It is important to recognize that the activity of growth in learning (or improving) how to teach science is framed by particular social, cultural and historical contexts. In this manner, authentic growth is multi-dimensional and is always embedded in the processes of being, becoming and belonging to the professional field of science education. What has been seen in this multi-dimensional context of growth are ongoing emergent themes and interrelated voices that make apparent the continuous endeavor of teaching to learn and learning to teach. As such, self-evident descriptions and assertions of authentic growth must always be confronted by the tension between productive long-term and short-term resemblances of coherences attached to the human experience of learning how to teach science.

In this section, a conceptual framework for authentic growth that incorporates four interrelated quality criteria (ontological, educative, catalytic and tactical) is introduced to provide generative pathways to theorize and make sense of experiences within the context and complexities of successful teaching and learning of science and learning how to teach science. These quality criteria are adopted from Guba and Lincoln (1989) originally used as part of a system of criteria to judge experiences and outcomes associated with qualitative research. Since then, Tobin and Roth (2006) and Bayne (2009) have adopted this set of quality criteria to understand and judge the extent to which research participants and other stakeholders attend to ongoing, meaningful changes in their perspective due to participation in the research.
Articulated by Bayne (2009), ontological authenticity encompasses the extent to which an individual’s emic constructions are improved, matured, expanded and elaborated as a result of participating in sites and experiences to improve how to teach science. Just as science teachers shift roles and positions from pre-service teachers to in-service teachers, so too do their ways of being in and with others change as they continue to gain new understandings to teach and learn science. Ontological authenticity not only encompasses the new construction of the teachers’ way of being but also the construction of others as they participate in teaching and learning science. Educative authenticity involves the extent to which individual participants’ understanding of and appreciation for the construction of others are enhanced. Catalytic authenticity is the extent to which action is stimulated and facilitated as a result of participating in sites and experiences to improve how to teach science. For example, the interconnectedness of systemic (institutional) and individual actions frames and organizes normative stances that at times serve as barriers to teaching and learning science. How science teachers confront these complexities provides evidence to evaluate and judge catalytic authenticity. Tactical authenticity is evidenced when, as a result of participation, help is provided in meaningful and expansive ways to those who cannot access the resources to help themselves. Taken together, this system of quality criteria shapes and defines a generative understanding of authentic growth in the production of practices and outcomes (including reflective practice) of learning how to teach science.

Using Interpretive Frames to Depict Baseline and Post-Baseline Evidence

We turn now to discuss the conceptual understanding and facility of producing baseline and post-baseline evidence within the structure of ePortfolios. In this study, we are specifically concerned with the types of evidence selected and the impact of evidence on the nature and quality of reflective practice. Consistent with what we have argued above is the need to render and coordinate interpretive perspectives across forms of evidence to examine and document different approaches to authentic growth within the domain of reflective practice. In this process we are guided by the quality criteria to interpret diverse possibilities for depicting growth. We consider data as a form of evidence when used in an iterative and generative process to depict coherent and contradictory patterns of growth within reflective practice. Insights in the interpretive framework provide early and continual analysis of data as boundaries, perspectives and value positions change and update how evidence is depicted. Accordingly, the discursive spaces afforded by the creation of ePortfolios are springboards for anticipatory and emergent themes connecting and coordinating networks of baseline- and post-baseline evidence. In this manner, interpretive frameworks used to characterize emergent themes of authentic growth can simultaneously constitute and structure how reflective practice is depicted within and across network(s) of evidence. What is important about the application of a coordinated interpretive framework is that it addresses (1) the changes in the inner working of practice and (2) the creation of evidence that implicates educative value and authentic growth in knowledge and competency within the domain of reflective practice. As such, synthesis of coordinated sets of baseline- and post-baseline evidence can differentially structure and express growth within the domain of reflective practice. In other words, depiction of recognizable competent participation in teaching and learning to teach science is synthesized across baseline- and post-baseline evidence (Roth, van Eijck, Reis and Hsu 2008). In this process, networks of baseline and post-baseline evidence emerge conceptually linked in ePortfolio entries, not only by practice and experience, but also by a set of consistent interpretive framework used to theorize artifacts (including experience) and produce data and evidence from them.