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Evaluate and Assess Research Methods in Work Education: Determine if Methods Used to Evaluate Work Education Research are Valid and How Assessment of These Methods is Conducted

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Abstract

This manuscript will compare, research, and comment on how work education experts and practitioners conduct research and evaluations of learning models in today's modern society. It will measure how valid these practices are and how work education assessment tools are used to determine if learning is taking place. This paper will compare the different paradigms of learning between teaching adults vice teaching children, and give a historical perspective of how these paradigms were developed and modified over the years. The question on whether any of this research is considered useful and valid by educational practitioners will be debated and what experts in the field of work education have determined is worthwhile and should be pursued further. Kirkpatrick's fourth level of assessment will be introduced as a possible assessment model for evaluation work education research and evaluation. In conclusion the author will give his opinion and suggestions for improving work education research and evaluation methods.

Introduction

In today's society where everyone communicates globally in a matter of seconds, where technology changes in a matter of seconds, and industry requirements for trained workers changes almost as quickly, research has and is being done to determine the best way to teach work education, especially to adult learners. Andragogy, the art of teaching adults (Merriam-Webster, 2002) focuses on different learning styles used when teaching adults to be successful in today's workforce and the constant technological changes that forces industry to determine what training requirements are needed to be competitive and successful in today's global economy. One problem that researchers have found is when teaching adults we fall back on the pedagogical method, the art of teaching children (Merriam-Webster, 2002) when trying to determine the right paradigm or model to teach adult learners.

It is very important to teach adults in a manner that addresses their needs and expectations. Malcolm Knowles (1990) is the theorist who brought the concept of adult learning to the forefront of developing adult learning models. He argued that adulthood has arrived when people behave in adult ways, believe they are adults, and should be treated as adults. He taught that adult learning was special in a number of ways. He felt that adult learners bring a great deal of experience to the learning environment and should be considered a resource. He also stated that adult learners believe they should have a high degree of influence on what they learn, have active participation in that learning, and see applications for the learning. Adults also have high expectations on how their training is evaluated and, want feedback on these evaluations, and want to see how responses to feedback given on their training are acted upon.

"By adulthood people are self-directing. This is the concept that a lie in the heart of andragogy…andragogy is therefore student-centered, experience based, problem orientated and collaborative" (Burns, 1995, p. 16-17). These observations on how adults learn should be foremost in the researcher's strategy on how their research in work education models used today or are being developed for the future should be studied.

One of the main issues that concern industry and business today is workplace literacy. Companies are developing "workplace basic skills programs to address this issue…because this field is still evolving, research on different instruments used in these workplace skills programs is sketchy" (Taylor, 2008, p. 1-3). The impact of adult literacy in the Canadian and American workforce has become increasingly visible and the gap between demands and desired skills is growing (Taylor, 2008). The question arises "what are workplace literacy requirements? Hull and Sechler (1987) examined the nature and extent of adult literacy needs in several major U.S. Corporations. They discovered with the help of company managers, instructors and union trainers the skills needed to enter and progress on the job could be classified into five major categories: mathematics, reading, and writing, listening and speaking. (Taylor 2008). This seems like common sense to me, but since our schools can't seem to produce students that are entering the workforce that master these subject, research on "why" is definitely called for. Basic workplace research conducted by the American Society for Training and Development by the U.S. Department of Labor also examined the skills needed in the workplace. More recent employer complaints have focused on serious deficiencies in areas that focus on problem solving, personal and interpersonal skills. "These researchers developed a framework to study seven skill groups that include learning to learn, the 3 R's, communication, creative thinking, teamwork and leadership" (Carnevale, Gainer & Meltzer, 1988, p. 1). These authors propose that this framework is a prescription for a well rounded worker.

These seven skill groups are important as they lead directly into research and evaluation of workforce readiness. "Current economics and challenges in the competing global market have necessitated the rethinking of American corporations in utilizing their people…management now recognizes a need for workers to take on more responsibility in…production, sales and service" (O'Neil & Baker, 1992, p. 2). The authors also documented a fourteen step readiness and assessment methodology table that will measure workforce readiness competencies, and prototypes to measure these competencies. One of the measurement tools they employ was developed by U.S. Secretary of Labor called SCANS. This stands for The Secretary's Commission on Necessary Skills and it was commissioned in 1991. The Commission based its discussions and meetings with business owners, public employers, workers, supervisors, union leaders, plants and stores. The SCANS Commission developed a table that investigated five major competencies to measure workforce readiness competencies (SCANS, 1991). They investigated resources, interpersonal skills, how workers acquire information, how different systems are understood by workers, and use of technology.

Before we continue on and try to evaluate and assess research methods in work education, it is imperative to have a solid benchmark to measure what is known. Many educators and researchers have spent years trying to determine how effective the different research and evaluation methods are. The 106th Congress had a hearing titled Federal Education and Evaluation Efforts (Wigdor, 1999) to study the efforts of the Commission of Behavioral and Social Sciences and Education Research Council on Education and the Workforce. The main emphasis of the report concerns how people learn and the research methods used to determine there conclusions. For decades we have debated whether schools need to be teaching facts, or they need to focus on big ideas. The ability to plan a task, notice pattern, generate reasonable arguments are more closely intertwined with factual knowledge than was once believed. At the same time, the key to making factual useable knowledge is the mastery of concepts.

Further on in the report the author states all this research that is ongoing to how people learn in work education is not listened to by many educators and the influence of this research has gone largely unnoticed. The concern of researchers for the scientific validity of their findings often differs from the focus of educators on the applicability in real classroom settings.

Some questions that will be addressed in this manuscript will focus on what type of research and evaluation works and will actually be adopted by educators. Is large scale and sharply designed programs of research, demonstration, and evaluation the answer? Or is a new research model that incorporates strict research models and flexible evaluation techniques combined the best path to follow? What type of assessment methods will be used to evaluate the research data obtained, and how will these assessment matrices be welcome by educators as valid and reliable.

This papers approach to research, evaluation and assessment of work education will focus on four main themes; (a) History, (b) recent and current models in use today, (c) which models and studies are considered successful, (d) and conclusion and recommendations including a graphic of a workable research model.

Before continuing, the definition of evaluation and research will be explained. Michael Scrivan, one of the founders of evaluation, recently noted that there are nearly sixty different terms for evaluation that apply to one context or another. These include adjudge, appraise, analyze, assess, critique, grade, inspect, judge, rate, review, score, study, test and so on (cited in Patton, 2000). While these terms may appear confusing, Scrivan (cited in Patton, 2000) notes that the term evaluation "reflects not only the immense importance of the process of evaluation

in practical life" (p. 7). Early in the development of the field (Scriven 1967) defined evaluation as judging the worth of something. Fitzpatrick, Sanders, and Worthen (2004) believe evaluation uses inquiry methods to determine standards for judging quality, collecting relevant information, and applying the standards to determine quality, utility, effectiveness, and significance. Another question that needs to be explored is the difference between evaluation and research. Worthern and Sanders (1973) theorized "research itself varies across a wide spectrum, from basic research…which sometimes resembles evaluation in being applied to solve educational, and private sector problems" (p. 6). Research seeks conclusions*;* evaluation leads to judgments (Kirkpatrick, Sanders, & Worthern, 2004). This short description of the difference between research and evaluation appears to be straight forward, and has driven many well know educators to develop and implement different research and evaluation models for work education.

Today we use many different methods to impart learning in work education. Multimedia is used in every classroom and we consider it a tool of today's technology. As far back as 1912, research was conducted on the influence of media in work education. Thorndike (1912) recommended pictures as a labor saving device in instruction. Dunlap (1993) describes research in social work education methods since 1915 to 1991. The author discusses how "important research has been in social work education since the inception of the profession…there has been, however, pervasive and enduring confusion regarding the design and implementation of research curriculum" (p.293-301). Again there seems to be confusion, and as mentioned earlier in this paper much of this research goes unnoticed by many educators when designing teaching models.

The Workforce Education Center (WERC) was established in Pennsylvania in 2004. This organization focuses on the effective use of the Foundation Skills Framework by serving the educational needs of both the pre-employed and incumbent workers and provides a clear and concise vision for improving teaching and learning in the context of work (Hamilton, 2006). This organization concentrates on developing models that are flexible and supports work education that changes because of the changes in technology and the global economy.

The ancient rabbis proclaimed that every man should fulfill three important tasks during his lifetime: Plant a tree, have a son, and write a book…I don't now if Tyler ever planted a tree or had a son…but I believe he wrote a timeless book that has a positive impact on the world for many generations. Ralph Tyler's research philosophy and research methods appear to be the benchmark to follow presently and for years to come (Burks, 1998). Tyler's main goal was to simply suggest methods of studying and researching fundamental questions. Instead of answering the questions, an explanation given in the procedures by which these questions can be answered. In reality, his syllabus was intended as a thought-stimulator and research guide, not a set-in-concrete manifesto on curriculum philosophy (Burks, 1998).

Work education research is increasing in momentum as educators and school administrators try to develop instructional models that meet the requirements of educating our workforce in this constantly changing world. Problem-based learning (PBL) is focused, experiential learning (minds-on, hands on) organized around the investigation organized around the investigation and resolution of messy, real world problems…PBL curriculum provides authentic experiences foster active learning, support knowledge construction (Torp & Sage, 2002). This education model makes sense to me. It is flexible, and changes with industry and technology requirements.

Robert Slavin (2004) writes "education research can and must address what works questions" (p. 27-28). In a rebuttal to David Olson's (2004) belief that education research has little to offer educators…that such research treatments are too diverse, too context bound, to

permit useful generalizations, Slavin (2004) feels that education has an obligation to answer what works questions that educators…policymakers ask, then our job is to produce answers that are well justified.

What works is also a common thread that ties research and evaluation together. Sanders (1979) identified several general areas of competence important for evaluators. These included the ability to describe the object and context of an evaluation; to conceptualize appropriate purposes and framework for the evaluation; to identify and select appropriate evaluation questions, information needs, and sources of information; to select means for collecting and analyzing information; to determine the value of the object of an evaluation; to communicate plans and results effectively to audiences; to manage the evaluation; to maintain ethical standards; to adjust to external factors influencing the evaluation; and to evaluate the evaluation (metaevaluation) (Sanders 1979). These general areas of competence that Sanders identified need to be investigated on an individual basis, but they do emphasize the differences between research and evaluation.

Program evaluation started during the 1800's in England and Ireland because of dissatisfaction with educational and social programs in Great Britain…reform movements in which government-appointed royal commissions…led to external inspectorates in England and Ireland (Fitzpatrick, Sanders, & Worthen, 2004). In the United States, educational evaluation in the 1800's took a slightly different bent…influenced by Horace Mann's comprehensive annual, empirical reports on Massachusetts education in the 1840's, and the Boston School Committees 1845…use of printed tests in several subjects…wide scale assessment of student achievement serving as a basis for school comparisons (Fitzpatrick, Sanders, & Worthen, 2004). Evaluation became more formal in the early 19th century when Flexner (1910) convinced the American Medical Society to support accreditation evaluations of medical schools. Flexner's report described a "pitless exposure" of medical training practices in these institutions (Flexner, 1960, p.79). The emergence of modern program evaluation became reality starting in 1964, and became a profession in 1973. From 1973 through 1984 many well known writers proposed new and differing models. Scrivin (1972) working to move evaluators beyond the rote application of objective based evaluation, proposed *goal-free evaluation*, urging evaluators to examine the processes and context of the program in order to find unintended outcomes. Stuffelbeam (1971) responding for the need for evaluations that were more informative to decision makers, developed the *CIPP Model.*

Aspect of evaluation	Type of decision	Kind of question answered
Context evaluation	Planning decisions	What should we do?
Input evaluation	Structuring decisions	How should we do it?
Process evaluation	Implementing decisions	Are we doing it as planned? And if not, why not?
Product evaluation	Recycling decisions	Did it work?

Figure 1. The CIPP model of evaluation

Stake (1975) proposed responsive evaluation, moving evaluators away from the dominance of the experimental, social science paradigms. Guba and Lincoln (1981), building on Stakes qualitative work, proposed naturalistic evaluation.

There are many research and evaluation models in use today, and many experts are developing newer and hopefully easier to use models. This author will argue that no one research or evaluation model is the answer, but a combination of models that will be flexible, efficient, easy to understand and easy to use.

While exploring data for this manuscript, it was discovered that there was so much information collected, dispersed, discussed, investigated and theorized on the subject of work education research, evaluation and assessment that it was difficult to separate all the data and make sense of it.

Another discovery was that many researchers still focus more on "Pedagogical" methods of learning which is the direct opposite of the Andragogical (derived from the Greek word *agogos* meaning "leading"). This method pioneered by Malcolm Knowles (1990) brought the concept of adult learning to the forefront of developing adult learning models. Smith (2002) wrote that Knowles was convinced that adults learn differently than children. This provided a basis for a distinctive field of enquiry. Similarly, his charting of the development of the adult education movement in the United States helped him come to some conclusions about the shape and direction of adult education. Since 1830, the term andragogy had been in spasmodic usage, and Knowles popularized it usage in the English language (Smith, 2002). The five crucial assumptions in digest form that Knowles felt was necessary for adults to learn were, self-concept, experience, readiness to learn, orientation to learning and the motivation to learn (Smith, 2002). Smith (2002) remarks these assertions and the claims of difference between andragogy and pedagogy is the subject of considerable debate among other researchers in the field. Useful critiques of these notions can be found in Jarvis (1987) and Tennant and Pogson (1996). The reader can make their own observations about Malcolm Knowles theories, but they appear to be common sense. The question is "how do we design models to accommodate Knowles" ideas if we do believe that his assertions are correct and children do learn differently than adults.

One of the biggest challenges today is illiteracy in the workforce (Hull & Sechler, 1987). It affects those entering and those already there. Hull and Sechler (1987) examined the nature and extent of adult literacy needs in several major U.S. Corporations with the help of company managers, instructors and union trainers. They discovered the skills needed to enter and progress on the job could be classified into five major categories: mathematics, reading, writing, and listening and speaking (Taylor, 2008). Carnevale, Gainer and Meltzer (1988) developed a framework to study seven skills deemed by industry as crucial for an educated workforce and included reading, writing, mathematics, communication skills, creative thinking, teamwork and leadership. These skills are needed, but how are these skills communicated to the workforce?

The U.S. Department of Labor developed a measurement tool called The Secretary's Commission on Necessary Skills (SCANS) that measures workers competencies. (SCANS, 1991). The SCANS Model focuses on five competencies in some detail, but the following is a condensed overview.

Competence requires:

- **Basic Skills** -- reading, writing, arithmetic and mathematics, speaking and listening;
- **Thinking Skills** -- thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning;
- **Personal Qualities** -- individual responsibility, self-esteem, sociability, self-management, and integrity.

O'Neil and Baker (1992) emphasized how important these competencies are and how they lead directly into research and evaluation of workforce readiness. Current economies and challenges in the competing global market have necessitated the rethinking of American corporations in utilizing their people.

Many models are available to research and evaluate work education models that actually work and ensure that today's workers are able to gain mastery in these competencies. As mentioned previously, work education models were developed as far back as 1910 and continued to be developed and researched until the Second World War. It wasn't until 1949 when Ralph W. Tyler wrote his book *Basic Principals of Curriculum and Instruction* that real attention was given to the complexities of developing models for work education for the work force after World War Two (Tyler, 1949). This book was an attempt to explain a rationale for viewing, analyzing, and interpret curriculum and instructional programs of an educational institution. Tyler's rationale has four fundamental questions which must be answered in developing any curriculum and plan of instruction. These are:

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that is likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained? (Tyler, 1949, p.1)

These questions made educators think and many developed models of their own. Some were supportive and modified Tyler's ideas and some disagreed, but the real science of work education research and evaluation was born.

Some other research and evaluation models that were developed because of Tyler's efforts have been tailored to fit today's work environment and industry needs. Brinkerhoff (1997) wrote a *Survey of Instructional Development Models* and these authors reviewed some models that were deemed to have merit. The models included:

- *The Gerlach and Ely Model.* This model recognizes the cyclic nature of instructional development as well as the concurrency of some of the fundamental operations. The cycle begins with the specification of objectives and content…followed by assessment of entering behaviors. Five tasks proceed concurrently: determination of strategy, Organization of groups, allocation of time, allocation of space, and allocation of resources. (Gustafson & Branch , 1997, p. 36)

- *The Kemp, Morrison, and Ross Model.* This model focuses on curriculum and planning but also includes project management and support services. It identifies nine elements that should be addressed: Instructional problems, learner characteristics, subject content, instructional objectives, sequence content, instructional strategies, instructional delivery, evaluation and resources. These resources are "wrapped" in a continuous cycle of evaluation and revision. (Gustafson & Branch, 1997, pp. 37-40)

As stated in the introduction of this paper, research and evaluation models in education overlap but are different. Evaluation of instruction and curriculum began in the mid 19th Century in America. But it was during and after the Second World War that applied social research expanded and methods and models had to be developed to evaluate that

research. Developments in educational program evaluation between 1940 and 1965 were unfolding is a different pattern. The 1940's generally saw a period of consolidation of earlier evaluation developments (Fitzpatrick, Sanders, & Worthen, 2004). The 1940's saw consolidation of earlier evaluation developments. School personnel devoted their energies to improve standardized testing, design, accreditation, and surveys (Fitzpatrick, Sanders & Worthen, 2004). During the 1950's and 1960s, Tyler's approach was enhanced by teaching educators how to state objectives in explicit and measurable terms, and providing taxonomies in the cognitive and affective domains (Fitzpatrick, Sanders & Worthen, 2004)

The emergence of modern program evaluation started in 1964. President Lyndon Johnson began the war on poverty called the "Great Society" and work education models had to be researched and evaluated because of the lack of expertise in the field within the government. There were very few government employees that that had the relevant competencies, expertise and technical qualifications to support the undertakings of an administration that wanted to level the playing field for all segments of society. In 1973, evaluation became a science and profession. Educators like Scriven (1972) proposed goal free evaluations and Stufflebeam (1971) developed the *CIPP* model highlighted in this papers introduction. The American Evaluation Association (AEA) was formed in 1985, merging the Evaluation Society and Evaluation Network, with a membership of 3000 (Kirkpatrick, Sanders & Worthen, 2004). Ralph Tyler not only developed a model to help researchers, he developed a process called the *Tylerian Evaluation Approach*. His approach followed these steps:

1. Establish broad goals or objectives
2. Classify the goals or objectives
3. Define objectives in behavioral terms
4. Find situations in which achievement or objectives can be shown
5. Develop or select measurement techniques
6. Collect performance data
7. Compare performance data with behavioral stated objectives

Tyler's rationale was logical, scientifically acceptable, readily adaptable, by evaluators, and had great influence on subsequent evaluation theorists (Kirkpatrick, Sanders & Worthen, 2004).

Over the years educators have refined and reformulated the purposes of schooling into various forms. *A Handbook of Educational Variables* (Nawakoski, Bunda, Working, Bernaki, & Harrington, 1985) divides secondary students into seven categories; intellectual, emotional, physical and recreational, aesthetic and cultural, moral vocational and social. This shows how much Tyler's original approach has been refined (Kirkpatrick, Sanders, & Worthen, 2004). Goodard (1979) stressed that evaluation and improvement of American schools cannot make much headway until these purposes have been discussed, accepted, operationally defined, and monitored. A standard standardized test, achievement of basic skills, and standards-based tests provide insufficient data to evaluate our schools (Goodard, 1979). Therefore our evaluation of teaching models and assessment of these models need to be flexible, broad-based, efficient, and current concerning modern education, business and industry concerns.

There are also many methods used to assess success in our evaluation methods. We have a habit of interchanging the meaning of assessment and evaluation together. That is understandable based on the definition of assessment as "the action or an instance of assessing" and evaluation as "to determine the significant worth, condition, of something by a careful

appraisal (Merriam-Webster, 2002). They are similar, but we need some way to measure the value and success of our research and evaluation methods.

Donald Kirkpatrick's (1994) four levels of evaluation and assessment including; reactions, learning, transfer and results are the benchmark method of evaluating research and evaluation models. The forth level can be developed into a rubric to assess whether the evaluation of research is valid.

Kirkpatrick's Level IV (Results)

1. This level measures the success of a program in terms that managers and executives can understand. This will also apply to educators and experts in the work education field. He talks about increased production, improved quality, decreased costs, increased sales (implementation of training product) and return on investment (ROI)
2. From a business and organizational perspective, this is the overall reason for a training program, yet is not typically addressed.
3. Determine results in financial terms is difficult to measure, and is hard to link directly with training or education

The fourth level makes an excellent rubric to measure educational research and evaluation models, because it asks for the bottom line. This paper has shown how much research is needed to develop the ideal work education teaching model.

In conclusion, there is no such thing as a perfect teaching model and a combination of models is needed to be able to adapt to the changing global economy and educational needs of business and industry. This author would suggest that Tyler's model should be the basis for all learning model development. A combination of the Tyler with the Kemp, Morrison, Ross Model would meet most needs of modern educators in work education. Additionally, the difference between research and evaluation was explored and it was discovered that they overlapped. This overlap however was with a distinct mission in the building and development of learning models. Assessment of evaluation was difficult to discern because of there similarities, but Kirkpatrick's fourth level was determined to be a good tool to develop into an assessment rubric.

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