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Developing generic workplace attributes through technology education courses in high schools

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Abstract
Traditionally listed under work ethic attributes, employability skills and traits have come to the forefront over the last decade as basics for entry into the workplace and as an asset for those who continue into post-secondary education. Without them, obtaining and retaining employment following schooling is a challenge for youth, especially with respect to the non-technical skills. Extensive research has helped to identify the appropriate work attributes, and although they may continue to be refined over time, the challenge presented to the educational system is how to best teach or develop them, particularly within a high school setting when most students are completing their basic education programmes.

Following a brief discussion of the nature and extent of these employability attributes, the intent of this paper is to demonstrate that technology education programmes present an excellent opportunity in terms of delivery. A number of optional approaches are outlined within this subject area, together with examples and perspectives from current research on how to assess the attainment of such attributes.

With the growing emphasis on successful transitions from high school in North America, the essential skills, knowledge and attitudes attained by youth through schooling are coming under closer scrutiny. The various pathways followed by students after school typically portray differing combinations of further education, work and unemployment, each followed with varying degrees of success (Lowe, et al, 1997; Sharpe and White, 1993). For those students headed directly into business and industry in particular, a number of generic employability skills or attributes (versus specific vocational competencies) considered essential to workplace success have been identified through extensive research involving business and industry. Such workplace attributes have been cited in numerous national reports and by various non-governmental agencies as being critical for new job market entrants and as being at the heart of job performance. They are also considered desirable assets for those who continue with their education beyond high school (Gray and Herr, 1998; Secretary’s Commission, 1991).

Opinions vary on the most appropriate time and place to purposefully develop such attributes. It could be argued that vocational programmes present the most appropriate opportunities. However, given the need to provide all school leavers with more flexible options and more useful transferable skills, it will be rationalised in this paper that technology education courses, delivered within the secondary school setting as part of the general education of students, present ideal opportunities for the teaching and reinforcement of such generic workplace attributes.

Generic workplace attributes
A modern economy needs workers who are not only technically competent, but who also possess appropriate work habits, attitudes, reasoning skills and academic competencies (Lewis, 1996; Stasz, 1996). Collectively, these non-technical attributes are considered essential in terms of obtaining and retaining employment. Numerous reports cite, among other factors, the changing nature of the workplace, the need for ‘upskilling’, restructuring, accelerating technological change, the growing participation of employees in decision making, the demand for higher levels of communications and computer skills, and the need for continuous...
learning as influential forces that extend job entry requirements beyond just having the basic academics. These identified attributes are particularly essential for new job market entrants, especially that large group making the transition from high school. Without them, many youth face the prospects of dead-end jobs and periods of unemployment; and while many of these personal traits have been traditionally desired by employers, the apparent lack of them in recent new employees is an on-going concern.

The nature of these employability skills, or work place attributes, has emerged through extensive surveys of businesses and other research. Various schemes have been used to categorise them, including that of the often cited United States Secretary of Labor Commission on Achieving Necessary Skills (SCANS) (1991); and the skills profile developed by the Conference Board of Canada (1993). A review of over thirty reports by Cotton (1993) placed the most commonly identified skills and traits into the three broad categories of: (a) basic skills (communications, reading, arithmetic and writing); (b) higher-order thinking skills (such as problem solving, learning skills, creative thinking, decision making, acquiring and using information, understanding complex relationships, and working with a variety of technologies); and (c) affective skills and traits (such as dependability, positive attitude, punctuality, interpersonal and team skills, self-confidence, adaptability, motivation, self-discipline, integrity, and ability to work independently). The assorted reports typically provided some definitions and examples of these various skills and traits. Overall, there is a great deal of agreement on what these employee attributes should be.

Technology education as a vehicle

In his article on ‘Productivity, the Workforce and Technology Education’, Johnson (1991) presents a cogent argument for teaching generic work skills through technology education, and leaving the development of specific vocational competencies to post-secondary education programmes, since he maintains, the specific skills taught in school-based vocational education are often obsolete by the time a student reaches the workplace. While specific technical skills are needed by employees, they are no longer a significant condition of employment. He maintains that the practical hands-on approaches typically applied in technology education classes provide an ideal opportunity to teach and reinforce such skills which are needed, regardless of the pathway followed after school, to keep up with rapid changes in society and the workplace. A well designed and delivered technology education curriculum will be able to enhance future workforce productivity because it (a) is well suited to reinforce what students have learned in other curricular areas, (b) is ideal for enhancing cognitive process abilities, and (c) promotes active involvement with technology’ (p. 43). Students are able to apply the basic academics through curriculum delivery processes that forces students to think, reason and make decisions and thus develop, among other work related attributes, cognitive abilities.

A review of technology education programme curriculum documents produced by North American Provinces and States reveal that work related attributes are typically encompassed within the broader set of programme goals and objectives as outcomes for students to achieve. For example, in the Province of Newfoundland, the technology education curriculum framework documents specifically address work attributes, and state that the programme can make specific contributions through the development of analytical and critical thinking skills, problem solving, and the enhancement of communication skills. Also, through planned activities, it can foster self-esteem, pride in workmanship, development of work habits, self-confidence, adaptability, and attitudes necessary for lifelong learning and career change (Department of Education, 1993:4)

Similar statements are evident or implied in many other State and Provincial technology education curriculum documents. They are typically expressed in broad statements (general outcomes). For example, the Province of British Columbia (1994:1) curriculum guide addresses employability
skills under the ‘preparing for the workplace’ and ‘discover how technology has changed society and the workplace’ outcomes. Other jurisdictions may list them under ‘developing personal management skills’, and ‘improving social interaction action skills’ (Alberta Education, 1994:3); ‘developing technological literacy’ (Savage, 1996:5); or ‘develop and use critical thinking and problem solving’ and ‘develop an attitude that learning is lifelong’ (Commission on Technology Education for New Jersey, 1987:3).

Given such goals or broad outcomes, which in many curriculum documents are further expanded into examples of employability attributes, it logically follows that teachers involved with technology education should address them through course delivery. Further support for this can be derived from the very nature of the content, procedures and processes employed in the delivery of the programme courses within which teachers typically utilise problem solving and design exercises. Through these, students work both individually and, or in small groups as design teams. The results of successfully implementing such approaches are, for example, likely to improve student communication skills, their ability to work co-operatively with others, and develop cognitive abilities including critical thinking. Employing group processes also promotes democratic approaches, which according to the findings of Gregson (1992:63), are much more effective in developing students work values than indoctrinational approaches to instruction such as lecturing. He suggests that ‘pedagogical strategies such as role playing/simulation, problem solving, and group discussion are democratic in nature because they encourage students to explore their attitudes and do not advocate one particular outcome’.

According to Stasz (1996) there is a growing consensus that new models of learning advanced by research in the cognitive sciences are conducive to developing affective work attributes. This supports the earlier work of others, including Johnson and Thomas (1992:12) who strongly advocated cognitive-based approaches and concluded from their research that ‘instructional goals that highlight conceptual learning, thinking processes, and group skills are fundamental in technology education. They are also the types of learning goals that are best reached through the cognitive-oriented instruction techniques’. Johnson (1992) further expands on this by demonstrating how technology education can enhance higher order thinking skills and intellectual process development by exposing students to relevant experiential learning that engages them in core thinking processes, critical and creative thinking, and by developing metacognitive skills. In particular, he outlines the usefulness of cognitive apprenticeship through the three phases of modelling by the teacher, coaching students as they develop skills, and finally by employing fading, that is, withdrawing from involvement as students develop proficiency and independence. Teachers can assist students by facilitating the learning process and demonstrating, for example, ways by which students can organise knowledge, and by helping them building on, and relating to, what they already know.

There are a number of other suggestions and ideas that can help facilitate the instructional delivery process within technology education. Paramount among these is the need to explicitly state employability attributes in the form of specific intended programme outcomes or objectives rather than simply alluding to them indirectly and thus naively assuming students will attain them incidentally as they proceed through their course work. Clearly stated, understood by teachers, and communicated to students, they can be deliberately addressed through planned course activities. The better we can describe/state these outcomes, the better the chances are of convincing teachers to address them and successfully implementing suitable techniques within the classroom; and the greater likelihood that appropriate assessment techniques can be devised (or selected) and used. Teachers also need to understand group processes and group dynamics to effectively apply teamwork in design and problem solving exercises. Davis and Miller (1994:72) further suggest that ‘to promote effective collaboration of group members, grading
incentives must be tied not only to individual contributions but to the overall level of group accomplishment'. They also maintain that teamwork is based on sharing goals, tasks, experiences and consequences, and they stress that the process of group members identifying and working through problems themselves is as important as achieving a completed product.

A summary of additional recommendations for effective practises are listed by Cotton (1993) in her monograph entitled Developing Employability Skills. This includes, for example, the use of various group techniques such as role-playing and brainstorming; and allowing students to take on responsibility for their own learning with the teacher taking a facilitating versus teaching role. She also confirms that better results with learning employability skills are evident when teachers hold high expectations, communicate them to the students, and model them in practice.

Assessment
The assessment of generic workplace attributes is not a straightforward task, yet needs to be integrated into the educational process. McNabb (1997) and others warn of the complexity of the task and confirm that it presents significant challenges from both teaching and assessment perspectives. Examples of possible approaches that can help include combinations of rating scales, criterion checklists, student self-assessment instruments, and student portfolios. Also, Carey (1997), after recently reviewing over forty available tests and assessment systems containing a variety of techniques, suggested that suitable measures are currently available for elementary, high school and college level students, as well as for adults for assessing employability skills and traits.

Some of the many factors that need to be considered when implementing assessment schemes include how different teachers might interpret student behaviours; the degree to which measures be criterion referenced or normed; and the number of processes needed to measure the wide range of employability attributes. Grummon (1997) further contends that performance-based assessment, or authentic assessment of these work place attributes, may need several measures to be accurate, and may not for example, allow students to adequately demonstrate higher order thinking skills. Also, the different assessment approaches used need to match the purpose of the assessment which may be, for example, to provide formative feedback to students as they proceed through a programme, or provide job interview evidence to a potential employer.

Summary
There is a well recognised need for students to acquire employability attributes prior to job market entry. Such attributes are best developed through schooling, particularly under the rubric of technology education programmes where the appropriateness of the typically used problem solving and design processes, among other complementary techniques and methods, is well established. Educators however, need to be cognisant of the complexity of affective work skills and the challenges they present with respect to assessing whether or not students have attained them. Focusing on the establishment of these employability attributes in the high school years can assist students in that first major transition in their lives that takes place for most at the end of high school.

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