ESTE has experienced a resurgence in interest since the beginning of the 1990s. Increased attention to ESTE in technology education literature and at technology education conferences has been both substantial and steady. Technology educators are beginning to recognize the potential ESTE has in delivering on the promise of educational trends such as constructivism (see, e.g., Järvinen, 1998) and science-technology-society integration.

Meanwhile, ESTE is succeeding abroad. Technology education in some form is compulsory for elementary-aged children in such countries as the UK (Karwatska, 1994), Australia, Sweden and the Czech Republic (Dugger, 1995). The Origins of Industrial Arts in the US

The educational program now known as technology education in the US had generally been referred to as industrial arts from the depression era until the mid-1980s. Prior to the early 20th century, several programs of manual and industrial education were popular. Prominent educational philosophers such as Dewey saw value in such programs as manual arts and manual training, but felt that these programs lacked the cultural or social base which would recommend their inclusion in general education. Because many students at the time did not progress beyond the 8th grade, many proposals to improve industrial education focused on elementary education.

As a general-education subject, industrial arts had its start at Teachers College, Columbia University (Towers, Lux & Ray, 1966; cf. Zuga, 1934). It was intended as a cultural, progressive recasting of the existing manual subjects. Teachers College is generally recognized for popularizing the term industrial arts as a replacement for manual arts (cf. Snyder, 1902). Its faculty and graduate students were responsible for the "first and only" (Brown, 1977, p. 2) definition of industrial arts, written by Teachers College staffers Bonser and Mossman (1923), as well as the social-industrial theory of industrial arts (Snedden & Warner, 1927). Even as late as the 1970s, the precepts underlying the Bonser and Mossman definition were considered to be the "basis of our present day philosophy" (ACESIA, 1971, p. 50) of elementary-school industrial arts.

Before the 20th Century

Hostetter (1974) argued that the precursors of elementary-school industrial arts in the US came from around the globe from the early Egyptians, the Babylonians, from the peoples of Asia, and from the ancient Greeks and Romans. According to Hostetter, nineteenth-century influences also came from abroad. Examples included handwork and crafts programs from England, children's technical education in post-Revolutionary France, and the Scandinavian Sloyd system. Apparently, the philosophies of the Sloyd system and the Russian manual-training emphasis were already present in the Boston and New York elementary schools by the 1880s (Swierkos & Morse, 1973).

Anderson (1926) discussed the key international figures influencing industrial arts in the US:
Confounding Issues

William E. Warner, a student of Bonser's, later popularized the general shop in secondary industrial arts ("social and liberal elements in the study of the industrial arts are more significant than are the elements involved in the mere manipulation of materials" (Bonser, 1910, p. 28).)

Today, Bonser, probably with Mossman, organized a room in which students experienced activities in shopwork, drawing, and home economics. It seems clear, however, that ideally being completely integrated with the rest of the school curriculum. Seventy-five years later, these are tenets of technology education at all levels. Confounding issues in many histories of industrial arts, the progression of the educational ideal of cultural industrial education, exemplified by the works of Basedow, Comenius, and others, is presented simultaneously with the concurrent history of tool instruction and its historical figures such as Della Vos and Runkle (e.g., Anderson, 1926, p. 155; Nelson, 1988). Yet these movements were quite distinct.

Hostetter (1974) identified Bacon, Comenius, Locke, Rousseau, Pestalozzi, and Froebel (p. 213-215) as leading western educational philosophers who influenced elementary-school industrial arts in the U.S. Miller (1979) added Kant, Hegel, and Herbart to this list. Kirkwood (1994) mentioned most of these names, but also emphasized Sheldon's role in implementing Herbart's ideas in the U.S.

Gerbracht and Babcock (1960) also underscored Sheldon's importance in popularizing "Pestalozzian methods" in the US, as well as his significance in the history of elementary school industrial arts in the U.S. Interestingly, certain writers seem to be much more likely to credit Sheldon and his program of ideas (rather than creators of ideas, such as Pestalozzi) with influence in the forming of elementary-school industrial arts in the US. Often it is these same writers (e.g. Kirkwood, 1968; Kirkwood & South, 1973) and Gerbracht and Babcock are good examples who view elementary school industrial arts or technology education as a method of teaching rather than as a distinct school subject.

At least three distinct conceptions of industrial education are often confounded and presented as the early history of the field. One such program was manual training. Manual training programs for children and young adults primarily consisted of tool instruction, although programs such as Woodward's had cultural dimensions (see Zuga, 1980, for a treatment of this program). Secondly, object teaching (Mossman, 1924), a movement formalized by Pestalozzi, emphasized the value of manipulative activities in teaching children, and was thus quite different than manual training. Finally, manual arts (Griffith, 1920), sought to provide social or cultural education to children via industrial experiences.

Industrial Education Context of the Industrial Arts Movement

Distinguishing among the terms industrial arts, manual training, and manual arts, Bonnett (1937) explained that "in the term industrial arts, the "industrial" is emphasized; while, in manual arts, the "arts" is historically the distinctive word and, in the term manual training, "manual" is the important word" (p. 455).

To Russell, Dean of Teachers College, manual training in practice was rarely more than a series of disjointed projects serving little cultural purpose severally or as a program. The following is a frequently cited explication of his opinion.

Wooly sheep have sported with polar bears under fir trees set in a desert of sand. Book-binding and block houses, Indian war bonnets and water wheels, inkwells and Navajo blankets, bent iron jimmicks and raffia baskets, bookshelves and dolls' clothes, broom holders and picture frames all these and a thousand more mixed up in indiscernible confusion! Is it any wonder that some one should raise the cry of fads and frills? The wonder is that any one should try to justify such work in school on any ground other than mere recreation. (Russell & Bosner, 1914, p. 4)

Teachers College faculty members Bosner and Mossman (1923) were still using the term "manual training" to identify the prevailing interpretation of industrial education in the 1920s. In Industrial Arts for Elementary Schools they drew a sharp distinction between manual training and their program of industrial arts, which could generally be considered an attempt at reconciling cultural industrial education and object teaching.

According to industrial education historian Bennett (1937), Bosner's first contribution in applying Dewey's philosophy was a 1913 paper in which he "expanded the conception of industrial arts in the elementary school." Bosner considered industrial arts to be "both a subject and a method an end and a means" (p. 453). To Kirkwood (1954), Bosner and Mossman were "clearly prescient" of trends which would later gain popularity in general education (p. 78). These trends included the integration of school subjects, cultural literacy, and project-based learning. Although Kirkwood noted the relationship between the ideas of Dewey and the writings of Bosner and Mossman, he also emphasized the connection between these writings and the work of Herbart, who perhaps influenced Mossman more than he did Bosner.

The Influence of Bosner and Mossman

Just as current technology-education curricula are composed of content organizers such as manufacturing, communication, and the like, Lois Coffey Mossman's organization of the study of industry included several content areas. But hers were a bit different: foods, clothing, shelter, records of human experiences, containers, and tools and machines (Mossman, 1938; Bosner & Mossman, 1923).

It is clear from her earlier work that Mossman regarded industrial arts to be a distinct curricular area in the public schools (Coffey, 1909a, 1909b; Mossman, 1921). But ultimately, she did not regard any arrangement of practical subjects as a separate part of the curriculum, instead including studies of industry as a part of the social studies (Mossman, 1929b, 1938). In fact, she eventually ceased using the term "industrial arts" altogether (see Mossman, 1927, 1929a). It bears mention that in her major book concerning the elementary school curriculum, Mossman (1938) included all industrial arts content in the social studies curriculum.

She specified that much elementary-school subject matter was best learned through constructive activities. Although she believed that "genuine participation in the processes of making the products may develop respect for work and for man's inventive achievement" (1938, p. 60), she cautioned that construction should not be used when more efficient methods were available (Mossman, 1927).

Frederick Gordon Bosner (1875-1931) served as professor of education at the State Normal School in Cheney, Washington (Mossman, 1910) and professor of education and director of the training school at Western Illinois State Normal School (Luethemeyer & McPherson, 1975). It was at Western Illinois that he met Mossman and began his work in industrial arts education. In 1910 they both moved to Teachers College.

In Industrial Arts for Elementary Schools, Bosner and Mossman asked, "is there not also a body of experience and knowledge relative to the industrial arts which is of common value to all, regardless of sex or occupation?" (1923, p. 20). While many have cited this passage as evidence that Bonser and Mossman regarded industrial arts as a subject matter, it also demonstrates their belief that industrial humanism, be it traditionally female (cooking, sewing) or male (woodwork, drafting), should be experienced by all students, regardless of sex. Secondly, they positioned industrial arts as general education for elementary students, noting that it is appropriate for all, "regardless of occupation."

"Because of its very extensive relationships," they wrote, "industrial arts, of all subjects is not a special subject in the sense of being unrelated to other subjects, but, quite the contrary, it is rather the most general subject of all in its far-reaching relationships" (Bosner and Mossman, 1923, p. 74; emphasis added). They viewed industrial arts as ideally being completely integrated with the rest of the school curriculum. Seventy-five years later, these are tenets of technology education at all levels.

Bosner and Mossman were also influential in developing the multiple-activities method of teaching industrial arts (Luethemeyer & McPherson, 1975) popularized before World War II first as the general shop approach, and later as the exploratorium approach of the 1970s. This method also foreshadowed educational activity centers popular today. Bosner, probably with Mossman, organized a room in which students experienced activities in shopwork, drawing, and home economics. It seems clear, however, that Bosner and Mossman were more interested in connections with regular school subjects than in imparting tool skills to students (see Coffey, 1909b). They believed that "the social and liberal elements in the study of the industrial arts are more significant than are the elements involved in the mere manipulation of materials" (Bosner, 1910, p. 28).

William E. Warner, a student of Bonser's, later popularized the general shop in secondary industrial arts (Gemmill, 1983). The term general shop is still used to describe the
Formation of ACESIA

Origins of the Subject vs. Method Debate

As the influence of Bonser and Mossman's work began to be felt, an essential argument emerged: was elementary-school industrial arts primarily a school subject, or was it a method of teaching other elementary-school subjects? In the 1970s, when this debate became heated, some writers noted that Bonser and Mossman favored both views. Bonser, who died in 1931, may not have had the chance to address the debate. Mossman later made it clear that she favored the method view, recommending that industrial subject matter be included in the elementary curriculum as part of social studies, which at the time was an emerging school subject.

In a 1972 School and Society article, Bonser stated his opinion of the place of industrial arts in the school curriculum:

"Bonser spelled out the major subdivisions of content, such as the activities to provide food, clothing, and shelter, but he did not develop a complete subject matter structure." (p. 106). The authors credited Warner with continuing the Bonser and Mossman tradition.

Several other writers have implied that a lack of a subject-matter structure hindered complete acceptance of Bonser and Mossman's work. Yet those who favored a subject-matter view of industrial-school industrial arts (e.g., Hoots, 1974) still sought to reconcile the subject-matter view with the writings of Bonser and Mossman.

Although some felt that the ideas in the Bonser-Mossman book were "somewhat difficult to follow and somewhat difficult to implement" (Hoots, 1974, p. 227), others at Teachers College explicata these ideas more clearly in books written for the practitioner. The same year that the Bonser and Mossman book was published, Jane Welling and Charlotte Callins published Social and Industrial Studies for the Elementary Grades (1923), which provided practical examples of implementing Bonser and Mossman's work. Clara Stillman (1922), Alice Krackowizer (1926), and Margaret Wells (1929), all of Teachers College, produced similarly practical elementary-school industrial arts books in the years preceding the publication of the Bonser and Mossman book.

While most of the publications related to elementary-school industrial arts in the 1920s and 1930s were practice-oriented, at least one Teachers College study employed empirical methods. Theresa Gunther's (1931) research substantiated Bonser and Mossman's claims that to be effective, industrial arts should be manipulative. Gunther's study notwithstanding, Bicknell noted in 1942 that studies have been made of certain practices followed in the elementary school, which reveal that constructional activities have been carried on as a part of the elementary school program. However, none of these studies has dealt with constructional activities as they actually function in the complete program of the elementary school today.

In fact, there appears to have been very little literature published about elementary-school industrial arts from the mid-1930s until the 1960s. 'Following the work of Bonser and Mossman in the first quarter of the 20th century, the absence of citations in the professional literature indicates that there were no substantial new developments in elementary school industrial arts until the early 1960s' (Miller, 1979, p. 50-51). As further evidence of an apparent lack of interest during these years, Hostetter (1974) noted that "for many years prior to 1958 there was no effort made to coordinate the existing (elementary-school industrial arts) programs" (p. 219).

Formation of ACESIA

Bruce (1964) found that in the early 1960s, more than 140 colleges and universities in the U.S. offered courses in elementary-school industrial arts. It was only a matter of time before an organization was formed to represent this area of industrial arts. The American Council for Elementary School Industrial Arts (ACESIA) was founded in 1962 as a council of the American Industrial Arts Association.

Miller (1979) specified that Mary-Margaret Scozby and Elizabeth Hunt, both known for their work outside of industrial arts, were most responsible for the formation and early success of ACESIA. He also cited the importance of Hoots (1971) publication Industrial Arts in the Elementary School: Education for a Changing Society, which was a report of the 1969 National Conference on Elementary School Industrial Arts. The conference, apparently the only one of its kind ever to be held in the US, was funded by the U.S. Office of Education.

Hunt (e.g., 1963), the first president of ACESIA, noted that neither tradition nor conjecture was sufficient in making a case for industrial arts in the elementary curriculum. She argued that research was needed to inform practice. Apparently, Bicknell's call for further research, issued during World War II, had gone unheeded.

Downs (1968) echoed the need for research, noting that many professional articles argued in favor of industrial arts in elementary schools, but that "research evidence is lacking to substantiate the argument for the inclusion of a constructional activities approach in the elementary curriculum" (Downs, 1968, p. 29). Thirty years later, the dilemma remains (Zuga, 1990, 1997).

Elementary-School Industrial Arts in the Late 20th Century

The relative success of elementary-school industrial arts throughout the twentieth century seems to have been closely related to the degree to which it was associated with popular programs in general education. For example, industrial arts fit well with the activity movement of the 1920s and 1930s. The activity movement was part of the larger program of progressive education. When progressive education fell out of favor before World War II, the field of industrial arts seems to have lost some of its interest in its elementary-school program.

In the 1960s and 1970s, career education, a popular general-education program, provided a vehicle for elementary-school industrial arts to realize a resurgence in popularity in the industrial arts profession. Career education did not begin as a part of industrial arts, but former U.S. Commissioner of Education Sidney Redland, who is often identified as having initiated the career-education movement of the 1970s, credited industrial-arts pioneers Russell and Dewey with many of the ideas underlying career education (O'Bannon, 1975).

Indeed, during the 1970s, "the most significant shift in elementary school industrial arts resulted from an increased emphasis on career education" (Miller, 1979, p. 54). Miller (1979) predicted that the trend would continue. He also predicted that the emphasis on technological literacy would spur efforts in elementary school industrial arts in the 20th century. Probably due to the formation of ACESIA and the popularity of career education, elementary programs began to garner attention in the industrial-arts press in the late 1960s and early 1970s.

Leeper (1978) suggested that two programs initiated after the formation of ACESIA especially embodied the philosophy of "Bonser and others" (p. 18): Technology for Children the Technological Exploratorium K-6. The Technological Exploratorium (Howsley, n.d.) was an early-1970s project in the Hudson, Ohio schools. Elementary students learned about technology and its three areas: communication, manufacturing, and transportation. This project, which was coordinated with the elementary curriculum,
The Technology for Children (T4C) program (e.g., Dugger, 1997) was also nationally recognized, garnering frequent citations in professional publications. Developed at Rutgers University for the State of New Jersey's Department of Education, T4C was a concerted program of technological and career-related activities. Ultimately, though, Dugger (1997) wrote, T4C was organized as a "vehicle to provide children with individualized experiential learning and opportunities to develop interests and self-awareness" (p. 1). Dugger went on to note that the T4C program implied the thorough integration of the elementary curriculum.

According to Elliot (1971), the T4C program "borrowed" heavily from the British Infant School, and from the "problem-solving," "hands-on" approaches to learning (p. 64). The T4C program was considered in part to be a vehicle for elementary-school career education. Three separate studies were conducted in the late 1970s to determine the program's success in improving career maturity, but they were generally inconclusive (Zuga, 1997).

Resurfacing of the Subject vs. Method Debate

In Bruce's 1964 study of 141 college-level elementary-school industrial arts courses, 130 were found to use Gerbracht and Babcock's 1950 book, Industrial Arts for Grades K-6 (revised in 1969), as a text or reference. The book was specifically used as a text in 56 of these courses, making it clearly the most popular text of the time. All other books used as texts in more than 10 courses were either crafts or handwriting books. Although it was then over 40 years old, Bonser and Mossman's Industrial Arts for Elementary Schools was used as a text in four courses, and cited as a reference in 86 others.

Gerbracht and Babcock made it clear that they favored the method view of industrial arts, while many of the leaders of ACESIA, Scobery (e.g., 1968) perhaps chief among them, seem to have favored the subject-matter position. Gerbracht and Babcock (1969) identified eight "contributions of industrial arts to elementary education" (p. 14), none of which related to industrial-arts subject matter. Industrial arts, they said, made contributions to elementary education in the areas of intellectual development, individual differences among students, socialization, occupational awareness, satisfaction in school, motivation, cultural literacy, and basic skills in language and mathematics, as well as manual skills. Gerbracht and Babcock clearly considered Bonser and Mossman to be among their philosophical influences.

Hoots (1974) argued that proponents of the method view could not rightfully lay claim to the true heritage of Bonser and Mossman. He wrote that in the elementary-school industrial arts field, sometime after Bonser's death, "there was a transition toward an arts and crafts and/or handicrafts approach. It is probable that this approach, as well as the 'method of teaching' approach, stemmed from an out-of-context application of the Bonser philosophy" (Hoots, 1974, p. 234). In describing the method view, Hoots (1974) made reference exclusively to Gerbracht and Babcock's 1969 book.

In the late 1960s and early 1970s, elementary-school industrial arts appeared to be gaining in popularity, having been established in at least 42 US states (Pinelli & West, 1973). But in 1974, Ingram and Pace were only able to identify 80 colleges or universities offering elementary-school industrial arts courses, far fewer than the 141 Bruce had found ten years earlier. Ingram and Pace used different methodology than Bruce did, so a direct comparison of the two studies is not appropriate. Nonetheless, by the mid-1970s, fewer and fewer teacher-preparation institutions were offering elementary-school industrial arts courses. By the mid-1980s, very few universities offered industrial education courses for elementary-education majors.

The Move toward Technology Education

From the mid-1970s until the early 1990s, industrial education at the elementary level drew comparably little attention in the arts literature. This may have been due to several reasons, including the demise of career education, leadership changes in ACESIA, the elimination of many elementary-school industrial arts classes at universities and colleges across the US, and the preoccupation of the industrial arts field with changing its name to technology education. In 1987, ACESIA became the Technology Education for Children Council.

The move toward technology education was virtually nonexistent in elementary schools in the U.S., although many believe that the field should "become more proactive at the elementary school" level (Salinger, 1994, p. 7).

Current Theories of Elementary-School Technology Education

At least three distinct perspectives of ESTE are evident from the literature. Although the views are not mutually exclusive, each seems to be the result of a different philosophy of technology education.

Technology education as content. Proponents of the current view see ESTE primarily as providing students with knowledge about technology. To them, technology is an "academic discipline" (e.g., T.T. Wright, 1996, p. 2). The National Science Foundation and the National Aeronautics and Space Administration recently awarded over $1 million for the establishment of the Technology For All Americans project, whose members are developing standards for K-12 technology education in the U.S. These standards are predicated on the view that technology education is a school subject with "quantifiable and universal" content (Dugger, 1997, p. 11); the elementary-education components of the project are discussed in Singletary and Allice, 1997).

The content view is clear in many historically influential ESTE texts intended for pre-service elementary classroom teachers, notably Industrial Arts for Elementary Schools (Bonser & Mossman, 1923) and Teaching Children About Technology (Scobery, 1968). Recent advocates of the content view include Dugger (1997), Kieff (1988), and others.

Technology education as process. Another view regards ESTE as a process or skill to be taught to children, and which has attendant content related to replicating the process. In this view, ESTE is often referred to as "children's engineering" (Dunn & Larson, 1990, p. 37) or design technology (see Hil, 1994). Design technology is "about identifying needs, generating ideas, planning and creating, testing, and finding the best solutions" (Ackerman, Etchison, Lydic, & Spiro, 1997, p. 7). Thus it differs from the content view insofar as it focuses more on technological capabilities than on knowledge. Todd and Hutchinson (1990) differentiated the process view from the content view when they described design technology as a "new paradigm" for education (p. 4).

Technology education as method. The method view of ESTE "begins with three things in mind. The first and certainly the most important is the child, the second is the elementary school curriculum, and the third is an appropriate technology activity" (Kirkwood, 1992, p. 30). Here, the content is drawn from the existing elementary curriculum, not from a curriculum of technological content. Historically, this view has been championed by Gerbracht and Babcock (1969) and other university-level textbook authors.

In a recent interview (Bottrill, 1996), Colleen Stone, a district technology education coordinator, discussed the instruction in technology teaching which she received from Delaware state education specialists. "From the very beginning, technology education was introduced to us as an integrator of the curriculum" (p. 14). When working with teachers in her district, Stone emphasizes employing technology education as a means of delivering the curriculum. The method view regards ESTE as a vehicle teachers may use to help children achieve educational objectives.

Elementary-School Technology Education in Practice in the U.S.

Although a series of distinct philosophies of ESTE is evident in the literature, it is unlikely that many ESTE programs reflect one view exclusively. Bottrill (1997), for example, regarded "activities as an area of technology education" (p. 3) but not the only area. In practice, decisions about how and when to implement ESTE in the classroom are "typically grounded in curriculum requirements, students' academic, social, and emotional development" and other considerations (Knobloch, 1996, p. 10; see also Welty, 1997). Remaining Challenges
The debate as to whether elementary-school technology education should be viewed as a subject or method may be academic, but it has limited the implementation of ESTE in the US over the past three-quarters of a century. Clearly, the debate has stymied cooperation among differing scholars. This problem dates back at least to Warner and Selvidge in the post-World-War-II period, and is exemplified in Hoots' writings in the early 1970s as well as in divided participation in the Technology Education for Children Council and the International Technology Education Association throughout the 1990s. If there is any truth to prevailing stereotypes about college professors and elementary-school teachers, this debate may also be silently widening the gap between theorists (who may tend to focus on the importance of technical content and may overestimate teachers' technical knowledge) and practitioners (who are likely to practice the 'method' philosophy). Well-meaning curriculum writers seem to be producing materials that are of limited use to teachers. Interestingly, it is exactly this increased creation of ESTE materials, which is sometimes cited to demonstrate increased implementation of ESTE.

Current trends in elementary education imply that public education in the US may finally be ready for true implementation of ESTE. In the past, trends favorable to ESTE included progressive education, the open concept, and career education. Today's constructivism and comprehensive school-to-work initiatives could well be delivered with the use of ESTE. To take advantage of present opportunities, leaders in technology education may have to compromise, conceding the content issue.

There is some hope that the content-method debate may soon be transcended. (Welty, 1997; cf. M. Wright, 1996) has conceptualized a modern system of views of ESTE. He has proposed that elementary educators see ESTE as some combination not only of content and method, but as content and process as well. This step beyond the black-and-white content-method debate may allow proponents of the ESTE-as-content view to reconcile their differences with method proponents by regarding the processes of technology (e.g., design, material manipulation, etc.) as the content of technology education, at least for young children. Viewing ESTE as a context or process is especially important in design and technology (Raizen, Sellwood, Todd, & Vickers, 1995), and may for once permit the field to move beyond the stifling content-method debate. With its professional house in order, the time may be right for ESTE to receive a full hearing from the educational community.

**Final Thoughts**

Using teacher preparation figures as a measure, technology education in the US has been in decline for years (Welty, 1993; 1997). At the same time, conference sessions and published literature (e.g. Gober, 1996) suggest that professionals in the field still believe strongly that all students should receive technology education from kindergarten through twelfth grade. And they believe in the importance of the content they teach. By these measures, the field may still have the opportunity to deliver technology education to every student.

The first step may be to recognize a few lessons from history. Educational trends come and go, and implementation of ESTE during a friendly trend may not guarantee its retention when that trend falls out of favor. Secondly, internal rivalries and academic debates in the technology education field have historically not aided in generating positive interest in ESTE from the larger educational community.

Finally, history suggests that the content-method debate must be openly addressed if ESTE professionals are to affect true ESTE implementation in US public schools. Contemporary literature contains plausible alternatives to the content-method dichotomy. Perhaps the field should investigate these possibilities and then move on to realize its promise in improving the education and lives of all children.

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Application of research methodologies typically used outside of evidence-based medicine, like the Delphi model, may reduce variance in HEOR quality. Ann Rheum Dis 2009; 68:954-960. 2 Custer RL, Scarcella JA, Stewart BR. The modified Delphi technique—a rotational modification. J Vocat Tech Ed 1999; 15:50-58. 3 Weiss PF, et al. Delphi Decision Making Process. The Delphi method was originally developed in the early 1950s at the RAND Corporation by Olaf Helmer and Norman Dalkey to systematically solicit the view of experts related to national defense and later in controversial sociopolitical areas of discourse (Custer, Scarcella, Stewart, 1999). The term originates from Greek mythology. Delphi was the site of the Delphic oracle, the most important oracle in the classical Greek world. Thus, the Delphi method may thought of as an expert brainstorm. The Modified Delphi Technique - A Rotational Modification. Journal of Vocational and Technical Education. Vol. 15, Num. The Delphi technique has evolved dramatically since its first application in the 1950s. Researchers have expanded its uses and modified the procedures through which they gather information. The evolution of computers and their applications have simplified the decision-making part of the Delphi process. Computer models can now make more efficient use of the data gathered through basic techniques and generate highly realistic projections and results of future events. The modifications and enhanced computers have by no means banished Delphi to the scrap heap of forecasting history. Indeed, the op Application of the modified delphi technique. IRDAYANTI Mat Nashir1; RAMLEE Mustapha2; ABDULLAH Yusoff 3. 1, 2 Faculty of Technical and Vocational Education. Modified Delphi technique is a framework used to conduct a research by collecting and analyzing opinions of a group of experts in the fields of the chosen study. This method has changed a lot with various modifications based on the needs and goals of a study, conducted. In relation to education, Olaf Helmer (2002) stated that this technique is efficient in. The Modified Delphi Technique - A Rotational Modification. Journal of Career and Technical Education. 1999;19(2). [59] Riggs WE. The Delphi Technique: An Experimental Evaluation. Technological Forecasting and Social Change. 1983;23:89-94. [60] Rowe G, Wright G. The Delphi technique: Past, present, and future prospects - Introduction to the special issue. Technological Forecasting & Social Change. 2011;78:1487-90.