

Proposed Application of the Delphi Method for Expert Consensus Building Within Forensic Rehabilitation Research: A Literature Review

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Over the past several decades, consensus methods have grown in popularity due to their ability to guide effective decision making in situations where contradictory or insufficient information is available. The Delphi method of consensus building within forensic rehabilitation consulting is introduced as a potential methodology that is well suited for extracting variables or ideas from a diverse group of experts that is untainted by social pressure or authority figures. The article provides the results of a literature review of articles related to the application of the Delphi method to the field of rehabilitation counseling, vocational evaluation and life care planning. Further research is recommended toward demonstrating the efficacy and validity of the Delphi method in a forensic application.

The development of forensic evidence by rehabilitation experts has been strongly influenced by civil case law. For decades, the generally accepted standard under *Frye v. United States* (*Frye vs. United States*, 1923) allowed for ipse dixit testimony from experts. Ipse dixit is a Latin term meaning "he himself said it" (NOLO Legal Encyclopedia, 2010). In other words, the only proof we have of a fact in evidence is that an expert said it. However, beginning in 1993 with the watershed case of *Daubert v. Merrell Dow Pharmaceutical* (*Daubert v. Merrell Dow Pharmaceuticals*, 1993), expert testimony began to come under greater scrutiny in terms of tested theories, methods, and protocols.

The *Daubert* decision provided clear guidance for the admission of "scientific" testimony, but did not provide the necessary flexibility inherent in non-basic science disciplines such as the social sciences. In the 1997 United States Supreme Court decision of *General Electric v. Joiner* (*General Electric Co. v. Joiner*, 1996), the high court affirmed the responsibility and discretion of the judge in serving as the "gatekeeper"

in either allowing or not allowing expert testimony. The *Daubert* standards were expanded upon with the 1999 decision in the case of *Kumho Tire Co. v. Carmichael* (*Kumho Tire Co. v. Carmichael*, 1999). The *Kumho Tire* case allowed for "considerable leeway" when scrutinizing expert testimony (Field & Choppa, 2005, p. 3). Unlike the *Daubert* ruling which relied upon analyzing an expert's testimony within the context of the scientific method, the *Kumho* ruling provided the courts guidance when evaluating an expert's "technical or specialized knowledge" (Field & Choppa, 2005, p. 3). This concept allowed for the introduction of testimony that was fairly independent of the scientific method. Such is the case in the social sciences, and in particular the field of forensic rehabilitation, where expert testimony may not completely meet the *Daubert* standards.

One of the most important factors when evaluating one's vocational capacity is the venue in which the legal action is at hand (Field, 2008). Because of the inherent variability within and between venues, vocational capacity assessment cannot be reduced to

what Choppa and Johnson (2008, p. 42) referred to as a "paint by number" methodology. In other words, a method or protocol used to evaluate vocational capacity in one venue is unlikely to be applied universally across all matters either within or between venues.

While the intent of the Daubert decision was to elevate the rigor of expert testimony within the framework of the scientific method, it provided poor guidance in evaluating testimony derived a combination of quantitative and qualitative research designs. Barros-Bailey and Neulicht (2005, p. 34) stated "regardless of the judicial jurisdiction or the rehabilitation focus, experts need a rigorous standard that addresses the gist of the Daubert factors and assists the trier of fact in determining whether, or how heavily, testimony is based on a more-probable-than-not analysis." Combining both qualitative and quantitative research approaches in forming expert opinions is what Barros-Bailey and Neulicht (2005), described as opinion validity.

Rehabilitation professionals derive quantitative data from standardized tests or from statistics published by any number of governmental or private sources. Qualitative data is derived from protocols such as the clinical interview and labor market search activities. Both of these data sources are crucial to the rehabilitation field, yet consensus as to their application eludes the profession. Choppa et al. (2004, p. 142) discussed the importance of clinical judgment that is based upon "sound assessment methodologies predicated on valid, reliable and relevant foundation information and data."

With such a wide array of data sources and application methods, it is of little surprise that opinions between forensic rehabilitation consultants, who review the same fact pattern in a case, often arrive at varying conclusions. This is particularly evident in areas such as earning capacity assessment, transferability of skills analysis, and work life expectancy. Because of the variability in the application of methods and protocols, research methods that seek to reach consensus would be particularly useful to the forensic rehabilitation field. Oftentimes it is difficult to achieve topical agreement or consensus among a group of experts because of the problems inherent in the group decision-making process (Jones & Hunter, 1995). What is necessary is a process of collective human input that minimizes the inherent problems

with "groupthink" where dominant members of the group may unduly influence the outcome of the process.

In the 1950's, Norman Dalkey of the Rand Corporation and Olaf Helmer of the Institute for the Future conceptualized the Delphi research method to gain expert consensus on national defense issues related to nuclear arms reduction between the United States and the former Soviet Union (Hakim & Weinblatt, 1993; Rowe & Wright, 1999). Since its conception, the Delphi approach has gained popularity as a consensus method due to the method's ability to guide effective decision making in situations where conflicting or insufficient information is available (Hasson, Keeney, & McKenna, 2000).

The Delphi Method

The Delphi method is intended to capture and guide the input efforts of an expert panel toward consensus (Vázquez-Ramos, 2003). Rowe and Wright (1999) characterized the Delphi method as the most reliable consensus method because it allows access to the positive attributes of group interaction, while controlling the negative effects of group dynamics. The method relies upon controlled feedback to ensure maximum interaction from all panel members, while maintaining each panelist's anonymity. Delphi panel members do not meet face to face, but rather through controlled feedback where they are encouraged to express and react to ideas free of pressure or rebuke from other panelists of higher standing within an expert community (Hakim & Weinblatt, 1993; Rowe & Wright, 1999; Hasson et al., 2000).

The Delphi Technique and Process

Vázquez-Ramos, Leahy, and Estrada Hernández (2007), described five phases in carrying out a Delphi study: expert panel selection, exploration, evaluation, reevaluation, and final consensus. The first phase, expert panel selection, is considered one of the most critical aspects of the Delphi process (Dawson & Brucker, 2001) because it directly impacts the validity of the study (Vázquez-Ramos et al., 2003). Selection of the expert panel typically involves non-probability sampling that is either purposeful or criterion based (Hasson et al., 2000). According to Ziglio (1996), as panel size increases, measurement error is reduced. However, too large a panel may make data analysis cumbersome (Hasson et al., 2000; Dawson & Brucker, 2001). While selecting an informed sam-

ple is important, Rowe and Wright (1999) caution that the number of panel experts does not necessarily translate to an effective panel. Thus, various researchers have recommended moderate sized panels including: 10–18 (Okoli & Pawlowski, 2004), 10–15 (Vázquez et al., 2003), and 20–40 (Burnes et al., 2003). Delphi studies from various professional disciplines have utilized an array of panel sizes ranging from 21 to 62: 62 for a study of participatory ethics in rehabilitation counseling (Vázquez–Ramos, 2003); 35 for a study of traumatic rehabilitation (Burns, Rivara, Johansen, & Thompson, 2003); 25 for a study to identify activities critical to evaluating personal care attendant services for individuals with spinal cord injury (Pomeranz, 2005); 21 for a study of rehabilitation counseling supervision competencies (Moorhouse, 2008); 63 for a study of depression (Morgan & Jorm, 2009); 124 for a study of cerebral palsy (McIntyre, Novak, & Cusick, 2009).

Following expert panel selection, the second Delphi phase, exploration (Delphi Round 1) begins. In this phase, the research team solicits expert ideas and opinions by providing several open-ended questions about the topic of interest (Jenkins & Smith, 1994). When all data are collected, the researcher collates, orders, and groups the data by theme to avoid overlap and repetition (Beech, 1999). Data from Delphi Round 1 are analyzed through qualitative content analysis. Like terms and ideas are grouped with the target of deriving one universal description of an issue or topic.

In round two of the Delphi (evaluation phase), panelists rate items identified in the previous round by utilizing a five to seven point Likert type scale. Additionally, panelists may also comment on their responses or add/edit additional items for clarity. This process becomes iterative and continues into subsequent rounds until consensus is reached and no additional information is obtained. Beginning with the third Delphi round (reevaluation phase), quantitative feedback is introduced to the panelists in a controlled fashion. A statistical summary is provided between iterations (Rowe & Wright, 1999) that may include any number of measures. Rowe and Wright (1999) describe studies providing feedback in the form of mean, median, mode, frequency, range, interquartile range and the panelists own previous round response. The type and style of feedback is determined by the researcher based upon the nature of

the research question.

The point at which consensus is achieved (final consensus phase) is referred to as stability and convergence (Hakim & Weinblatt, 1993; Vázquez–Ramos et al., 2007). Stability is the similarity of panelist response across questionnaires in subsequent rounds (Hakim & Weinblatt, 1993). Lack of stability of response across questionnaires should result in an item being removed from subsequent questionnaires (Hakim & Weinblatt, 1993). On the other hand, convergence is determined by the degree of consensus on a given question with increased dispersion indicating decreasing agreement between panelists (Hakim & Weinblatt, 1993). Varying authors have suggested consensus has been achieved, if a rate between 51 and 80 percent agreement between panelists is achieved (Hasson, Keeney, & McKenna, 2000). It is very important that the procedures described in the Delphi method are carried out mechanically (Helmer, 1975; Turoff & Hiltz, 1996; Dawson & Brucker, 2001). Failure to do so may jeopardize the validity of the Delphi study results (Helmer, 1975).

Research Applications of the Delphi Method

Since its introduction, the Delphi method has gained widespread acceptance as a scientifically accepted method for consensus building. Delphi has been applied in research studies in the social sciences (Vázquez–Ramos et al., 2007), business and technology (Jolson & Rossow, 1971; Okoli & Pawlowski, 2004), educational research (Streveler, Olds, Miller, & Nelson, 2003), social policy (Buck, Gross, Hakim, & Weinblatt, 1993), public health (Fink, Kosecoff, Chassin, & Brook, 1984), environmental issues (Zuboy & States, 1980), health and medicine (Burns, Rivara, Johansen, & Thompson, 2003; Graham, Regher, & Wright, 2003), and psychology (Doughty, 2009; Morgan & Jorm, 2009). A comprehensive literature review was completed to identify studies utilizing the Delphi method within the rehabilitation field. The literature review was initiated with the electronic database PsychINFO and followed up with Google scholar. The literature review was complemented by a review of the professional journals within the scope of rehabilitation counseling, vocational evaluation, and life care planning from 1993 to present. The literature revealed one conference paper presented at the International Conference on Aging, Disability and Independence and a total of eight

Table 1*Summary of Research on the Delphi Process*

<u>Author</u>	<u>Journal</u>	<u>Name</u>	<u>Rounds</u>	<u>N</u>
Hakim, S. & Weinblatt, J.	Evaluation and Program Planning	The Delphi Process as a Tool for Decision Making: The Case of Vocational Training of People with Handicaps	2	189
Rubin, E; McMahon, B; Chan, F. & Kamnetz, B	Journal of Rehabilitation	Research Directions Related to Rehabilitation Practice: A Delphi study	3	23
Currier, K.; Chang, F.; Berven, N.; Habeck, R & Taylor, D.	Rehabilitation Counseling Bulletin	Functions and Knowledge Domains for Disability Management Practice: A Delphi study	2	44
Thielsen, V & Leahy, M.	Rehabilitation Counseling Bulletin	Essential Knowledge and Skills for Effective Clinical Supervision in Rehabilitation Counseling (Delphi was used to Construct Survey Instrument)	3	18
Fong, C.; Rubin, S; Kubota, C.; Chronister, J. & Lee, G.	International Journal of Rehabilitation Research	Counselors and Consumers Derived Criteria for Assessing the Effectiveness of Rehabilitation Services	2	119
Pomeranz, J.; Shaw, L.; Sawyer, H. & Velozo, C.	Journal of Life Care Planning	Consensus Among Life Care Planners Regarding Activities to Consider When Recommending Personal Attendant Care Services for Individuals with Spinal Cord Injury: A Delphi study	3	25
Shaw, L.; Leahy, M; Chan, F. & Catalano, D.	Rehabilitation Education	Contemporary Issues Facing Rehabilitation Counseling: A Delphi Study of the Perspectives of Leaders of the Discipline	3	95
Baker, P. & Moon, N	Conference Presentation: International Conference on Aging, Disability and Independence	Policy Change and Accommodating Workplace: Issues, Barriers and Opportunities	Not discussed	Not discussed

peer reviewed journal articles. These articles are summarized in Table 1. Peer reviewed professional journals that have published articles on application of the Delphi method in rehabilitation included the *International Journal of Rehabilitation Research*; the *Rehabilitation Counseling Bulletin*; the *Journal of Evaluation and Program Planning*; the *Journal of Life Care Planning*; the *Journal of Rehabilitation*; and the *Journal of Rehabilitation Education*.

Review of Delphi Studies in the Rehabilitation Field

Hakim and Weinblatt (1993) utilized the Delphi method to evaluate the level of consensus that exists between federal legislators, federal and state policy makers and the directors and staff of rehabilitation centers. A panel of 189 subject matter experts were utilized in this study. The findings of the study revealed that neither federal legislators nor executives who oversee rehabilitation programs had an a priori awareness of their goals and objectives, nor did they share similar preferences.

Rubin et al. (1998) utilized the Delphi method to obtain consensus regarding priorities for rehabilitation credentialing and certification research in the area of health care and disability policy reform. A panel of 23 subject matter experts was utilized in this study. The expert panel was comprised of individuals in leadership positions within the rehabilitation profession credentialing bodies. Leadership was represented from the Commission on Rehabilitation Counselor Certification (CRCC), the Certification of Disability Management Specialists Commission (CDMSC), and the Commission for Case Manager Certification (CCMC). The study found the highest priority areas were credentialing and role differentiation, outcome research, and practice trends.

Currier et al. (2001) employed the Delphi method to examine the importance of job functions and knowledge domains to the practice of disability management. The Delphi panel was comprised of 44 experts from the field of disability management. The results of the study identified several functions and knowledge content domains important to the practice of disability management. The study also found some other functional and knowledge areas to be of greater or lesser relevance depending upon the level of intervention at which services are focused.

Thielsen and Leahy (2001) studied the supervisory

knowledge and skills necessary for effective field-based clinical supervision of rehabilitation counselors. This study was completed using the Rehabilitation Counseling Supervision Inventory (RCSI), which was an instrument developed through application of the Delphi method. The Delphi expert panel was composed of 18 individuals who cumulatively derived 110 discrete items, plus an additional 4 items derived from a literature review. Following two subsequent Delphi rounds, the RCSI was reduced to 95 discrete items. Moreover, after the development of the RCSI, the instrument was subjected to quantitative factor analysis and multivariate analysis of variance (MANOVA).

Chan et al. (2003) set out to study the opinions of rehabilitation counselors and consumers with respect to the effectiveness of vocational rehabilitation interventions. Before engaging in the Delphi method, the authors first held a focus group comprised of 10 rehabilitation supervisors, counselors and consumers. The goal of the focus group was to extract relevant qualitative information related to meaningful rehabilitation outcomes. Following completion of the focus group, the Delphi method was implemented to explicate additional consensus elements relevant to measuring rehabilitation gains resulting specifically from the provision of vocational rehabilitation services. The Delphi panel included 119 panelists comprised of both rehabilitation counselors and consumers. The focus group and Delphi round one yielded 27 items that were passed to Delphi round two. The findings of the study indicated the top five items in terms of expert consensus rankings were life skill items: job-seeking skills, communication, specific employability, mobility, and general employability.

Pomeranz et al. (2006) utilized the Delphi method to determine consensus regarding activities to be considered when making recommendations for personal attendant care (PCA) when developing a life care plan (LCP) for individuals with a spinal cord injury (SCI). This study is notable since it is the first and only peer reviewed publication identified in the literature that applied the Delphi method specifically to issues in the forensic rehabilitation area. One hundred panelists were invited to participate in the study, but only 25 completed all 3 rounds. The study resulted in 164 discrete items that should be considered when recommending PAC services for persons with a spinal cord injury. This study demonstrates the use of an

empirical method to support the assessment of need for personal assistance within a forensic arena. For example, Pomeranz et al. (2005), obtained consensus from expert life care planners that 164 activities should be considered when recommending personal assistance for individuals with spinal cord injury. The activities generated were comprehensive and comprised of activities related to self-care, home/yard maintenance, transportation, leisure, work, and education. Life care planners making a determination for personal assistance within these areas for an individual with a spinal cord injury could cite the Pomeranz study as empirical support for specific recommendations.

Shaw et al. (2006) used the Delphi method to evaluate consensus opinions among leaders in the rehabilitation counseling field regarding issues critical to the field of rehabilitation counseling. The study utilized a panel of 95 subject matter experts and yielded 41 items considered to be important issues in the field of rehabilitation counseling. The issues were categorized into five themes which included, (a) professional identity and recognition; (b) changes in service delivery systems; (c) education and training issues; (d) research; and (e) professional association issues.

Vázquez-Ramos et al. (2007) published a general article on the application of the Delphi method specifically to the field of rehabilitation counseling. Previous to this article, the author (Vázquez-Ramos, 2003) completed doctoral level research work applying the Delphi method to the study of participatory ethics in rehabilitation counseling. In the published article, Vázquez-Ramos et al. (2007) conceptualized the Delphi method specifically within the context of the rehabilitation counseling literature. The articles identified the advantages and disadvantages of using the Delphi in rehabilitation research.

Baker and Moon (2008) presented the results of a Delphi study that addressed policy barriers and opportunities for workplace accommodations associated with the employment of people with disabilities and the aging. This unpublished paper was presented at the 2008 International Conference on Aging, Disability and Independence. The paper did not provide specific parameters of the study, such as the Delphi panel composition or the number of rounds completed for the panel to reach expert consensus. However, the paper did discuss specific policy related

findings specific to the relationship between aging, disability and personal independence.

Conclusion

In summary, the Delphi method is a widely accepted method for gaining consensus on a wide range of issues. The method is particularly well suited for extracting variables or ideas from a diverse group of experts. The method also allows for expert input to be massaged and refined into a set of variables based on pure expert consensus that is untainted by social pressure or authority figures. The Delphi has been successfully employed in a number of studies specifically applicable to the field of rehabilitation counseling.

As mentioned earlier, Delphi is advantageous by providing for anonymity of panel members. Panelists are not required to meet face to face and may openly express and react to ideas without pressure from other panelists. It is anonymity that differentiates the Delphi method from other consensus building methods (Hasson, Keeney, & McKenna, 2000). Delphi's structured feedback mechanism allows panelists to change their opinions based upon group input versus peer pressure. Lastly, the method combines both qualitative and quantitative research methods which complement each other and enhances the overall design, thus resulting in greater reliability and validity (Barros-Bailey & Neulicht, 2005). Based upon a review of the literature, the Delphi method appears to be an appropriate consensus building methodology that is well suited to the field of forensic rehabilitation research. Further inquiry is warranted to examine the efficacy and validity of the method in such as application.

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