



THE IMPACT OF LMI ON THE CAREER DECISION-MAKING PROCESS:

LITERATURE REVIEW

PRESENTED TO

FORUM OF LABOUR MARKET MINISTERS (FLMM)
LABOUR MARKET INFORMATION GROUP

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SEPTEMBER 2005

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The authors would like to thank the following people, who are also members of the Forum of Labour Market Ministers (FLMM) Labour Market Information (LMI) working group, for their invaluable comments:

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	04
INTRODUCTION	04
1. The Dissemination of LMI via the Internet and Computer-based Systems.....	06
2. LMI With and Without a Counsellor	12
3. Level of Cognitive Complexity Required by LMI	17
4. Quantity and Quality of LMI	21
5. The Impact of LMI-related Products and Services	23
6. The Impact of LMI on the Economy and Society	24
7. Methods for Evaluating LMI	25
CONCLUSION	27
RECOMMENDATIONS AND POSSIBLE FOLLOW-UP ACTION.....	29
BIBLIOGRAPHY	32

EXECUTIVE SUMMARY

Most studies that discuss labour market information (LMI) as it relates to career decision-making report on the positive impact of computer-assisted programs were carried out before the Internet became a part of our information environment. These studies show that LMI has an impact on career development, but that it is virtually non significant unless transmitted through a counsellor. Indeed, the use of LMI with the assistance of a counsellor appears to be more effective than a computer-assisted program. An evaluation of the level of complexity indicates the effort required to process a large amount of information and its impact on people's ability to discriminate among occupations. It is also frequently noted that the desired information is linked to the interests expressed by people, even though other information could be used to make a well-informed decision. Lastly, the quantity and quality of information are important factors to take into account when one wants to disseminate LMI.

From the methodological standpoint, the limitations of these studies make it difficult to generalize the results. Most of the studies consulted considered the impact of LMI on American or British students only, without consideration for the impact on adults or Canadians. The findings of these studies confirm the importance of LMI in the career development process provided that certain conditions are met, including guidance from a counsellor.

Further research should make it possible to acquire a better understanding of the conditions needed to ensure that investment in LMI achieves the desired results not only with individuals, but on Canadian society generally. Thus in order to specifically study the impact of LMI, it would be appropriate to isolate this variable with a sample that would allow for generalization of the results. More valid methods of measuring the impact of LMI should also be developed. Lastly, the career decision process should be studied to determine the cognitive effort required to understand LMI, with a specific focus on clientele perceptions.

INTRODUCTION

The Forum of Labour Market Ministers (FLMM) Labour Market Information Group is interested in the impact or influence of providing labour market information (LMI) on career decision-

making. LMI includes all useful information for people looking for employment, whether they have a career decision to make, or want to improve their employment status. LMI is also intended for employers interested in the labour market situation or who are looking for skilled workers for their business.

For the FLMM's Labour Market Information working group, the design and delivery of LMI are subjects of common interest and concern to the various levels of government. It therefore requested a literature review in order to be able to evaluate the impact of LMI on the career development process for individuals and its repercussions on the various structures (economic, policy and program development) and on society in general. This literature review was commissioned to the Collectif de Recherche en Counseling et en Développement de Carrière (CRCDC) of Université de Sherbrooke's Career Counselling Department with a view to identifying both Canadian and international studies that have attempted to measure the impact of LMI on career development.

As part of this literature review, the main interest is the dissemination of LMI through the Internet and computer-assisted systems in order to determine the extent to which these tools have an impact on people's career development. Some studies are then examined to determine whether it is preferable to disseminate LMI with the assistance of a counsellor or some guidance. Additional studies focus on the cognitive complexity required to process a large amount of information, whereas another study specifically considers information quantity and quality. The literature review also covers the impact of LMI-related products and services on individuals, as well as on the economy and society in general. This is followed by a critical analysis of the methodologies used by the studies listed in this literature review. At the end of the review, recommendations are made, along with follow-up action suggested by the research team on the basis of the findings of the studies listed.

It is important to point out at the outset that LMI refers to the labour market's conditions and operations (O'Reilly, 2001), namely the full range of information about labour market conditions and trends, including employment and unemployment, wages, businesses and labour market projections (Sommers, 2000). Therefore LMI means any information that affects the labour market as a whole. It is also worth emphasizing, as Savickas (2001) does, the importance of

information in career development. According to Savickas, “Vocational exploration and information gathering increase self-knowledge and awareness of suitable educational and occupational options.”(p. 61). Patton and McCrindle (2001) believe that information is a crucial component in career decision-making. Furthermore, the need for information is constant, because the workplace changes and people make career-related decisions regularly. This need is also felt most vividly among young people, as demonstrated by Amiel, Jeunier, Morcillo and Tricot (2001). They ask a growing number of concrete questions about education, admissions, and the physical conditions for completing programs of study. They are even interested in statistical data (selection rate, failure rate, dropout rate). Given the importance and needs of LMI, this literature review attempts to document its impact on people’s career development.

1. The Dissemination of LMI via the Internet and Computer-based Systems

The use of the Internet to disseminate LMI is relatively recent. On the other hand, the use of computer-based systems to help people make decisions has been around for over 25 years. In the 1970s, research took stock of the impact of the various computer-assisted programs on people’s career development. To our knowledge, there has been no research specifically on the impact of LMI disseminated through the Internet on people’s career development. On the other hand, Offer (2000) reports on a survey conducted by Behrens and Altman (1998) that demonstrates that there is a demand for this type of service. These authors state that 80% of students questioned (180) believed that it would be better to receive information via the Internet than through books or directly from a personal meeting, that 85% would use a computer-based program to help them write their curriculum vitae and that 70% thought that computers could help them find a job more quickly than traditional job search methods. On the other hand, when job searches are unproductive, 75% would prefer to be able to discuss their problems or frustrations in one-on-one counselling rather than using a video camera and a computer; lastly, 90% would prefer feedback from a guidance counsellor to a computer in order to practise their interview techniques.

Although the Internet is considered as an important information medium, Imel, Kerka and Wonacott (2001) report considerable limitations. These authors found that the dissemination of a large amount of sometimes contradictory information over the Internet raises certain problems. The five following limitations were identified in their discussion of the role of occupational information in the career decision process:

- *User's skill*: to browse the Web and gather relevant information, a number of technical skills are necessary. Unfortunately, not everyone possesses these skills.
- *Information quality*: as the Web is an open system that is relatively uncontrolled from the quality standpoint, virtually anyone can create a site that contains career information, and some of this information may be misleading.
- *Equitable access*: while the Internet may facilitate access to information for a large number of people, the fact that certain strata in society may not have access to it can contribute to perpetuating social inequity in terms of employment.
- *How close users are to making their career decisions*: as each individual is unique in terms of their career path and their decision-making process, the problems and guidance needs vary from one person to another, whether in terms of clarifying information, asking questions or interpreting results.
- *Appropriateness/relevance of the tool*: some tools were not initially developed for use on the Internet and do not function as well in an online context. Some of the tools available online were created with a view to being used with the assistance of a career development professional.

The level of an individual's undecision, skills in using information tools and quality and accessibility of this information are all important factors to be considered in examining the impact of LMI on that individual's career development. As we will show below, these factors are major concerns in relation to Internet information searches and computer-assisted programs.

There has been research into the various computer-assisted programs. The CHOICES program (*Computerized Heuristic Occupational Information and Career Exploration System*) was developed by Employment and Immigration Canada, whereas DISCOVER (*American College Testing Program*), CIDS (*Computer Information Delivery System*), SIGI (*System of Interactive Guidance and Information*), GIS (*Guidance Information System*) and CVIS (*Computerized Vocational Information System*) are computer-assisted systems developed in the United States.

Pinder and Fitzgerald (1984) conducted research to evaluate the effectiveness of the CHOICES program on career decision-making. The sample consisted of 136 volunteer students from the

University of Central Florida. The authors measured career decision-making using 2 tools: the *Career Decision Scale* and *Assessment of Career Decision Making*. These 2 tools are acknowledged to be reliable and valid. The students were separated into 2 random groups, an experimental group and a control group. The first group completed the CHOICES guide, received a short period of training about how to use the system and then used the program and completed the 2 questionnaires both before and after having done so. The control group also completed the questionnaires both before and after, but did not use CHOICES. The impact was measured by comparing the results on the pre-test and post-test for the *Career Decision Scale* and the *Assessment of Career Decision Making*. The authors reported that CHOICES increased the participants' commitment significantly in terms of career decision-making: for the *Career Decision Scale* ($F = 8.839$ $p = <0.01$) and for the *Assessment of Career Decision Making* ($F = 7.150$ $p = <0.01$).

According to the authors, this research shows that a computer-assisted program like CHOICES can be an effective way of providing guidance to university students. On the other hand, the authors did not mention the fact that the use of a non-random sample may limit the extent to which the results can be generalized.

The DISCOVER program is one of the most widely used computer-assisted programs in the United States (*Computer-Assisted Career Guidance Systems: CACGS*). This program attempts to match an individual's psychological profile to occupations. Eveland, Conyne and Blakeny (1998) used DISCOVER to measure the participants' level of career decidedness. They therefore compared the results on the pre-test and post-test using the *Indecision Scale* of the *Career Decision Scale* developed by Osipow, Carney, Winer, Yanico and Koschier (1976). The sample consisted of 90 volunteer students at *Midwestern University's Career Development and Placement Center for career guidance services*. The results were analyzed using the *Scheffe Post Hoc* procedure to compare mean score increases under both sets of conditions: six hours with a counsellor to assist with the use of the DISCOVER program and to supervise the decision process begun with the computer program; two hours with the DISCOVER program without a counsellor. The results showed that using the DISCOVER program had a significant impact on increasing the participants' level of career decidedness when the computer was combined with a counsellor ($F = 7.1000$ $p = <0.05$). However, the results were less significant when the computer was used

without the guidance of a counsellor ($F = 3.3548$ $p = <0.05$). There was no significant increase in career decidedness in the control group ($F = 0.2069$ $p = <0.05$). Despite these results, the authors of the study concluded that the use of computer-based guidance programs without the assistance of a counsellor may be an important tool to increase the level of student career decidedness.

One of the limitations of the study, which was raised by the authors, is the fact that *Career Decision Scale* questionnaire was administered to the participants both before and after they used the program, which means that they may have been more sensitive to the post-test because they were able to acquire knowledge about the content. Furthermore, the fact that the sample was non-random limits the extent to which it can be generalized because it may not represent the population at large. We feel that it would have been interesting to isolate the counsellor variable just as the DISCOVER program variable was isolated, in other words isolate the impact of the counsellor's role on the increased level of career decidedness among participants. However, the researchers attempted to control the personal skills of the counsellor by establishing a protocol.

Thompson and LaRochelle (1985) assessed the impact and capacity of CIDS (*Computer Information Delivery System*), which is also known as CONSIDER/GIS, to disseminate high quality understandable information about occupations and job placement. The authors developed questionnaires that were used in participant interviews and drew information from the NOICC (*National Information Coordinating Committee*) databases. The sample consisted of 153 counsellors and 222 students who were using the program in the State of Connecticut. When the participants were asked how useful they felt the information was in developing action plans or decisions with respect to their education or career, the results were extremely positive. Indeed, 96% of the participants said that the information was useful. On the other hand, only 60% said that they intended to use this computer-assisted program in the future.

The authors identified several limitations of the methodology used in their study. They noted that the data had been gathered by means of instruments that measured subjective aspects such as user satisfaction, the desire to continue using the program, the level of satisfaction with the quality of information, whether the experience of using the program had been positive or negative, etc. The authors also added that the questionnaire used in the study had not been tested for reliability or validity, and that a control group had not been used to compare the results.

Another research team (Cochran, Hoffman, Strand and Warren, 1977) attempted to measure the impact of the SIGI (*System of Interactive Guidance Information*), an instrument developed by Katz (1974) on the status of career decidedness. According to the authors, the findings of the study indicate that university students who interact with a computer-assisted program have the educational decision-making process facilitated. The authors used a non-random sample of 72 B.A. students at Illinois State University. The students were randomly separated into 2 groups, an experimental group of 48 students and a control group of 24 students. Both groups did a pre-test and post-test on the *Vocational Decision-Making Checklist* developed by Harren (1966). Between the pre-test and the post-test, the experimental group used SIGI for three hours. A comparison of the pre-test and post-test on the *Vocational Decision-Making Checklist* showed that SIGI had had a positive impact ($F = 6.16$ $p = < 0.05$) on their education decisions.

The authors mentioned that these significant results needed to be interpreted with caution because they may have been more statistical than practical. Furthermore, the fact that a non-random sample was used makes it difficult to generalize them.

Research conducted by Ryan, Drummond and Bilodeau (1981) into the GIS (*Guidance Information System*) found that the program has several positive effects on career decision-making. Questionnaires developed by the authors were completed by users from eight service agencies to assess their responses from the very beginning of their using the program. Then, a questionnaire that was also developed by the authors was administered to the participants 4 to 6 weeks after the first session. The mean responses calculated showed that 73.7% of participants reported that the GIS had helped them clarify their educational decisions. Furthermore, the use of the program reduced the percentage of participants who only had a vague idea of their future career decisions from 52.6% to 26.3%. The authors did not identify any limitations of their study with respect to the methodology used. However, we note that a very small sample was used for their research (n=22).

The next study is the only one to have specific results for occupational information, a term that refers to a broad understanding of occupations, and planning and preparation for employment. In the study, 2 methods for transmitting information were compared. One of the methods was an occupational information system and the other, one-on-one meetings with a counsellor to provide

information about the occupations. The study, carried out by Maola and Kane (1976) used a sample of disadvantaged vocational students (who showed a lack of motivation in regular classrooms), from a vocational school in Ohio. Seventy-two students were selected on the basis of their having achieved at least basic reading skills. They were then divided into three groups: a group using only a computer, in which students spent an hour per week using the *Computerized Vocational Information System* (CVIS) program; a group with counselling, in which students met a counsellor for one hour per week; and a control group, to which only the post-test was administered. To evaluate which group of students had learned the most, three knowledge scales (characteristics, preparation and planning) from the *Assessment of Career Development* were used to establish the amount of information that had been acquired.

The results for the three scales show that students who received information by computer obtained significantly higher scores than those in the group with a counsellor and the control group. According to the authors, these results indicate that a computer-assisted program for transmitting occupational information is better than an occupational program that uses a one-on-one counsellor. The results also show that the 2 groups that had assistance learned significantly more than the control group. Furthermore, the study demonstrated that a computer-assisted program for transmitting occupational information to disadvantaged students in a vocational school was effective. In the final analysis, the authors wondered whether the same results would be obtained for regular students or if they were to use affective rather than cognitive criteria to measure the impact. They also speculated on whether the same results would be achieved with a longitudinal study.

Maola and Kane's study (1976) involves 2 significant methodological biases. These biases are conducive to positive results for a computer-based occupational information system compared to the other method of having a counsellor meet people to give them occupational information. The first of these biases has to do with the composition of the sample, which may not be typical of an educational environment like that with a counsellor. The second bias relates to the ability of counsellors, about whom we know little, apart from the fact that they are career guidance teachers accustomed to transmitting information in groups. It is also important to note that no link is made between LMI and the decisions made by these disadvantaged young people.

The studies almost always used samples of students, only one of which was specifically related to career decision-making. Only two of the studies used the same scale to measure the effect of one or more programs on decision-making. All of the studies reached similar conclusions: the programs had a positive impact on occupational decision-making. On the other hand, when they distinguish between the impact of computer-based information with or without a counsellor, the researchers reached contradictory conclusions. The meta-analyses that addressed the dissemination of LMI looked in greater detail into these practices. Research by Roney (1999) investigated the presence of the counsellor in terms of realistic choices.

2. LMI With and Without a Counsellor

The three meta-analyses that we will now present demonstrate that LMI has an impact on career development. On the other hand, this impact is virtually nonexistent if it is not provided through a counsellor.

The meta-analysis carried out by Oliver and Spokane (1988) illustrated the contribution made by the various forms of interventions to facilitate career development as they relate to the benefits to clients. The findings of this study tend to show that LMI transmitted by a counsellor has more influence than LMI without the mediation relationship. In their meta-analysis, which was based on 58 studies of 7,311 subjects, Oliver and Spokane (1988) isolated intervention without a counsellor. Although the authors did not describe the criteria for inclusion in each intervention category identified, it is likely that intervention without a counsellor was related to LMI. The authors measured interventions as they related to a variety of variables, including career decision-making, which they define as self-knowledge, the appropriation of choices, instrumental forms of behaviour such as searching for career-related information, security or opportunities for employment and educational perseverance.

The results were measured in terms of the effect computed by comparing each experimental group with the control group for each dependent variable. The studies show that regular interventions have a positive impact on the career decision-making process (the size of the effect is 0.48¹). On the other hand, interventions without a counsellor had virtually no impact (the size

¹ By weighting on the basis of size for studies that are not weighted, i.e. 0.82.

of the effect was 0.10). Furthermore, the fact that there is no significant effect between the “without a counsellor” variable and the “career decision-making” variable makes it difficult to clearly establish the impact of intervention without a counsellor on career decisions.

Oliver and Spokane (1988) identified the limitations of their meta-analysis. First of all, of the research studied, too few were interested in the same problem. Moreover, most of the participants were at high school or university. Lastly, it is generally difficult to measure and generalize results having to do with impact on the decision-making process. The authors also pointed out that very few measurements obtained from the studies that were analyzed could be classified as standardized, and that most of them used a variety of different measuring instruments, often developed by the authors themselves, which provide little information about the basis and development of the instruments, their validity or their accuracy.

There are other limitations to Oliver and Spokane’s (1988) meta-analysis. Only 8 of the 58 studies measured the impact of LMI on career decision-making and only 7 studies evaluated intervention without a counsellor. Even if the meta-analysis carried out by Oliver and Spokane (1988) would appear to indicate that LMI does not play a pivotal role in career decisions, a more detailed analysis shows that the information gathered was insufficient to reach such conclusions. As the career decision variable is a sub-variable of the career decision-making process variable, it was never isolated with a view to specifically verifying the impact of intervention without a counsellor on career decision-making. Furthermore, it is important to note that this meta-analysis shows that intervention without a counsellor has little impact on the career decision-making process.

The second meta-analysis was carried out by Whiston, Sexton and Lasoff (1998). The authors attempted to replicate and extend the Oliver and Spokane (1988) analysis by using more recent research in order to determine whether the results were still valid after 10 years of research. Whiston, Sexton and Lasoff (1998) reached the same conclusions as Oliver and Spokane (1988), namely that the “intervention without a counsellor” variable has little impact on the career decision-making process. Their analysis looked at 47 studies and 4,660 participants. The findings of the study are similar to those of Oliver and Spokane (1988) in the sense that interventions with

a counsellor had a positive impact on the process (0.38)². Intervention without a counsellor had very little impact (size of the effect was 0.12), which would appear to indicate that there was little positive impact on the career decision-making process.

Criticisms similar to those made for the Oliver and Spokane (1988) study are applicable here as well, because the subjects are mostly university level students and the same intervention categories and variables were used, namely interventions without a counsellor and career decisions. As for the Oliver and Spokane (1988) study, intervention without a counsellor was not defined, making it difficult to ensure that the intervention was related to LMI alone. The career choice variable is never analyzed independently as it relates to the “without a counsellor” variable. Furthermore, only 5 of the 47 studies included interventions without a counsellor and 12 of the 47 reported on the impact of interventions on career decision-making.

Whiston, Sexton and Lasoff (1998) raised a number of criticisms with respect to the validity of the analyses, because the studies do not all examine the same interventions or the same populations. For example, Whiston (2002) combined the Oliver and Spokane (1988) and Whiston, Sexton and Lasoff (1998) results to determine whether different career interventions could be considered to have empirical support. On the basis of the PESI (*Principles of Empirically Supported Interventions*), her results resembled those demonstrated by Oliver and Spokane (1988), namely that interventions without a counsellor seem to have little impact on the student career decision-making process. Whiston (2002) noted on the other hand that this did not necessarily mean that all interventions without a counsellor should be eliminated, but simply that they were not particularly helpful to the clients.

A third meta-analysis by Whiston, Brecheisen and Stephens (2003) focuses on a direct comparison of the various methods used in career intervention. The findings of the study corroborate the work of Oliver and Spokane (1988), Whiston *et al.* (1998) and Whiston (2002) about the minor positive impact of forms of intervention that do not involve a counsellor. The meta-analysis includes 57 studies conducted between 1975 and 2000 on 4,732 participants, using 149 methods of comparison and 736 comparisons of outcomes. The variables used by Whiston *et al.* (2003) are identical to those used by Oliver and Spokane (1988) and Whiston *et al.* (1998) and

² Studies weighted by size, i.e. 0.45 if the studies are not weighted.

Whiston (2002). The analyses of these forms of interventions that did not include a counsellor reveal that their effects are typically weaker compared to other types of interventions ($d^+ = -.470$). Thus exposure to a computer alone yields weaker outcomes than exposure to a computer combined with counselling ($d^+ = -.378$). There was also a significant difference between individual career counselling and the use of the computer alone. The use of the computer alone is more effective than having a counsellor alone ($d^+ = -.999$). Although highly significant, it is important to note that this was found in only two studies. Furthermore, variations in counsellors' personal and professional skills are not taken into consideration, although it is known that such variations have a significant influence on the effectiveness of counselling interventions (Lecomte, Savard, Drouin and Guillon, 2004). In addition, a computer intervention alone has less of an impact than other interventions without a counsellor ($d^+ = -.226$).

The results of this meta-analysis show that to be effective, career development interventions must include counselling. This conclusion is further corroborated by the findings that computer-assisted programs along with counselling are more effective than the use of a computer alone.

The main limitations of this meta-analysis primarily relate to the fact that only published research was considered. It was also pointed out that the measurement instruments used in the various types of research were not all standardized.

As mentioned earlier, the research carried by Roney (1999) may suggest that LMI ought to be given out by a counsellor to enable young people to make more realistic decisions. In fact, Roney studied how LMI could contribute to providing clients with a more realistic picture of the labour market and in particular, did an analysis of the beliefs that young people might have about high status occupations. Roney's study (1999) consisted of a representative sample of 2,250 high school students. These adolescents completed a questionnaire that asked them to consider the potential of a fictitious student who wanted to become a doctor. The students were randomly broken down into 8 groups that varied in terms of the information they were given about this profession. Half of them received information about the labour market, and the other half did not. In addition, half received educational information about the importance of having high marks (A) and the other half received information about the importance of having average marks (B-). Half of them also received information telling them about the desired social skills, namely applicants

who were popular, and the other half received information saying that what was being sought were those who were not popular. In terms of the effect of information received, the results showed that giving out labour market information about employment had a minor effect (effect size: 0.11), with a variance of barely 20%. Furthermore, the giving out of educational information was considered to have a moderate effect (effect size: 0.22) and social information had virtually no significance (effect size: .04). Information about education appears to have more of an impact than labour market information. On the basis of all the results, the author states that the students did not have realistic beliefs about the probability of becoming a doctor (a high status profession). Roney (1999) concluded that it is insufficient to simply transmit information for people to make realistic decisions. He also found that the stronger the students' academic performance and social commitment, the better they are able to evaluate labour market information.

Although the author himself did not mention any limitations on his research, we have a few to mention: for example, the conclusion was based on all occupations, whereas the author used only one high status occupation, that of doctor. In addition, the LMI presented to half the group was limited to two items of information, namely that only 4% of full-time workers in the United States were doctors and that one out of 10 high school students wanted to become a doctor. The subjects used in the study were also not given the information they needed. Nevertheless, one great strength of this study is that it introduced a methodology that makes it possible to isolate the LMI variable. This makes it possible to clearly demonstrate that it is not enough to process LMI without assistance to make a realistic career decision.

This research shows how important the assistance of a counsellor is in increasing the impact of disseminating LMI about career development. In connection with this topic, Imel *et al.* (2001) states that in view of the unique specific nature of each individual, everyone is entitled to their own career path and their own decision-making process. Thus from one individual to the next, there may be different requirements in terms of clarifying information and different questions about their own circumstances to broaden the scope. Savickas (2001) also says that "One of the best ways to determine the wisdom of a specific career choice is to assess the amount of information an individual has collected about that choice." (p. 61). Before looking into the quantity and quality of information, it would be useful to analyze the concept of cognitive

complexity, given the effort that may be required of someone to process labour market information.

3. Level of Cognitive Complexity Required by LMI

The concept of cognitive complexity stems from the following premise: for an individual to be able to deal with what is perceived or received from the environment, that individual must have the ability to process all of the complexity of that information. In fact, faced with an identical informational environment, some people find more complexity than others in their representations because their cognitive systems in themselves are characterized by greater or lesser degrees of complexity. Work on the development of this concept suggests that individuals manage information received on the basis of their own complexity (Schroder, Driver and Streufert (1967). Thus according to the theory, a cognitively complex individual assimilates more information, whether contradictory or not, than an individual who reasons more simply.

The concept of cognitive complexity has been defined by Bieri (1955) as “[Translation] the tendency to construct the social environment in a multidimensional manner, in such a way that a more cognitively complex individual will tend to perceive the behaviour of others in a more varied system than someone who is less cognitively complex” (Bieri, 1956, cited by Smith and Leach, 1972, p.38). There are two criteria for evaluating the multidimensionality or unidimensionality of the human cognitive system, level of differentiation and level of integration. The process of differentiation enables people to distinguish the variety of objects observed. The level of integration refers to an individual’s ability to establish links between the various dimensions or parts of the object. Thus the individual can manage to organize the information and to link it to previous knowledge. Indeed, if the components of the information are interpreted in the same way and the manner in which these mental constructions is simple, everything leads to an identical interpretation. On the other hand, when the individual can recognize and discriminate among the specific features of the various types of information from the surrounding physical and social environment, that individual can understand complex organization, which gives rise to a variety of interpretations.

The influence of the occupational information on the individual's cognitive structure has been studied by many authors (Bodden and James, 1976; Cesari, Winer, Zychlinski and Laird, 1989; Cesari, Winer and Piper, 1984). Bodden and James (1976) carried out a study to evaluate the effects of occupational information in terms of the cognitive complexity of the participants. They consider the concept of cognitive complexity or differentiation to be an important mediating variable in the career decision-making process. In fact, the individual's ability to process as much information as possible while being able to discriminate which of these items of information are the most important to be able to make a career decision, is important in the career decision-making process.

The research carried out by Bodden and James (1976) studied 52 participants, 29 men and 23 women, all recruited from an introductory B.A. level psychology course at *Texas Tech University*. These students were randomly separated into two groups, each of which was given one of two sets of information. The first set consisted of information related to 12 occupations, whereas the second consisted simply of a list of street addresses where information about these 12 occupations could be found. The locations were difficult to reach because of the distance that needed to be covered, with a view to discouraging the subjects from obtaining the information in question prior to the post-test.

The findings show that the impact of information can reduce cognitive complexity in terms of the world of work ($F=2.66$ $p<.02$). On the other hand, occupational information has no appreciable impact on the participants' ability to discriminate any specific occupation. The authors suggest that this is because receiving a great deal of information does not necessarily enable clients to further discriminate among the various occupations. Indeed, according to Bodden and James (1976), too much information can cause confusion. No limitations to the study were identified by the authors.

Cesari *et al.* (1982) attempted to replicate the Bodden and James (1976) study while controlling the decision/indecision vocational variable and their findings did not support Bodden and James (1976). According to Cesari *et al.* (1982), whether one receives information or has to seek it out for oneself does not appear to have an impact on the cognitive complexity of the subjects. The findings further show that the level of vocational decision/indecision was not influenced by the

giving of information. The research used a sample of 93 participants, 36 men and 57 women, from an introductory course in psychology at *Texas Tech University*. The *Career Decision Scale* was administered to all the participants to identify the occupational decision-making level, whereas the *Cognitive Differentiation Grid* attempted to measure cognitive complexity. The same procedure that Bodden and James (1976) used was followed. Once again, the participants were separated at random into two groups, one of which was given information about 12 occupations and the other given a list of street addresses where they could go and find information, although it was difficult to do so because of the great physical distance to be covered. The variance analyses did not show significant differences between the groups with respect to the “*Across constructs*” measurement ($F^3 = 0.59$ $p^4 < 0.05$) or the “*Across Occupations*” measurement ($F = 1.00$ $p < 0.05$).

The authors identified a number of limitations to their study. On the one hand, the groups did not have the same number of people in them, which could influence the results. On the other hand, the authors noted that it was difficult to draw conclusions and generalizations with respect to vocational counselling given some contradictory results, which is a reference to the fact that they were unable to reproduce the results obtained by Bodden and James (1976).

Another study by Cesari *et al.* (1984) attempted to focus on occupational information aspects by measuring the cognitive complexity of the participants as it related to their decision or indecision with respect to their career choices. This study used a sample of 280 university level students, 113 men and 167 women, all of whom were in an introduction to psychology course at *Southwestern University*. The *Career Decision Scale* was used to measure the participants’ level of decision/indecision towards their career, and the *Cognitive Differentiation Scale* was used to measure the participants’ cognitive complexity. Once the participants were assigned a status as decided (4 groups) or undecided (4 groups), the participants were given different information: information in a positive form with positive input, information presented in a negative form with comments from dissatisfied people, mixed information in which there is both a positive and negative tone in the comments for each occupation. For the fourth group (a control group), the

³ Means variance analysis.

⁴ Probability 95%.

participants received information that amounted to no more than a list of addresses to which they could write to receive more information within 48 hours or more.

The results on the participants' level of occupational decisiveness or undecisiveness did not demonstrate any significant impact on the level of cognitive complexity ($F = 0.31$ $p < 0.05$). On the other hand, there was a significant informational impact on cognitive complexity ($F = 2.71$ $p = < 0.05$). Positive occupational information was associated with simpler cognitive complexity results whereas the group that received negative information was associated with a higher level of cognitive complexity results.

Although the authors did not refer to any limitations of their research, a few can be identified in connection with the studies by Cesari *et al.* (1984) and Bodden and James (1976). First of all, the fact that all these studies on cognitive complexity used non-random samples: they consisted mainly of volunteer university students – which limits the ability to generalize the findings. The fact that this type of sampling was not random makes it impossible to generalize the results to the whole population in the study and to the population at large. Secondly, the authors never specified what constituted the validity or reliability of the instruments they used. There was also no reference made to the validity or reliability of the measurement instruments used and the information content concerning the concept of cognitive complexity was never defined or developed, which makes any interpretation of the results subjective, depending on the standpoint adopted.

This research also tended to give extra weight to the degree of differentiation in evaluating the level of cognitive complexity, whereas other authors think that it is not enough to use the level of differentiation as a criterion (Bannister and Mair, 1968; Maklouf Norris, Jones and Norris, 1970).

Although the study carried out by Foskett and Hemsley-Brown (1999) is not directly related to cognitive complexity, it provides a better understanding of why a given individual might assimilate certain types of information rather than others. The purpose of this research is to give a better understanding of the perceptions of 6th, 10th and 12th grade British adolescents with respect to their career, their education and their future training. The data were gathered using questionnaires administered at the beginning of group meetings. Data analysis revealed that the adolescents were only interested in information that was directly related to the interests they

stated at the beginning of the meetings, and ignored any new information that could have been helpful to them in making well-informed decisions. In such a context, it is likely that the assistance of a counsellor would be necessary to help people become more receptive to information that is potentially useful to them, by helping them make the links that would show them that it is relevant. This supports the comments made by Amundson (2001), who says that:

[Translation] In recent years, a great deal of attention has been paid to the development of computer tools to support occupational guidance...these tools are only effective if they are incorporated into positive counselling relationships. The computers need to be perceived not as a way of replacing counsellors, but as one of the ways available to enrich the counselling process (p. 45).

From this standpoint, the conclusion might be drawn that information itself is not sufficient to guide people in their career decisions. Without appropriate coaching, they are unable to take all the information needed into consideration to make well-informed decisions. However, occupational information was identified as essential to better informed decision-making with respect to career choices (Maola and Kane, 1976).

The research findings argue that people need accessible, accurate and well-organized information, together with the critical role played by a counsellor to guide them in interpreting and using this information (Imel *et al.* 2001). For example, in a study carried out with Canadian adolescents, Julien (1999) demonstrated that 60% of young people had trouble obtaining the information they needed, that 40% went to several different locations to find it, that 40% said they did not know where to go to obtain this information, and that 25% said they did not feel confident enough to request the information they wanted. Furthermore, many of them expressed negative attitudes towards a career decision-making program by means of a computer or about the lack of availability of a printer (Imel *et al.* 2001). These young people also said that they had encountered problems because of too much information, emotional barriers (frustration, anxiety, etc.) and the time required to make use of the information they find.

4. Quantity and Quality of LMI

Parnes and Kohen (1975) measured the importance of information quantity and quality. They carried out a study to measure the impact of the quantity of occupational information on the

occupational status of participants on the one hand, and on the other hand, whether the quality and quantity of LMI was positively related to level of education, intelligence and socio-economic status of their families. The study used a representative sample of 5,000 young American men between the ages of 14 and 24. Initially, the participants completed a questionnaire that measured their knowledge of the various employment options in addition to their level of knowledge about the trades and occupations. It was a three-part questionnaire: the first part used multiple choice questions asking respondents to identify the tasks involved in ten different occupations; the second part involved questions asking the subjects to indicate the level of education required for each of the ten occupations and the third part was based on their judgment about which of the occupations in question had the highest annual salary. Then, two years later, the participants were interviewed about their jobs and their incomes in order to establish their status within the labour market. Based on these data, the authors did a multiple regression analysis which demonstrated, among other things, that the quantity of LMI retained by the young people had an impact on their occupational status once they began working. Thus, two years after the administration of the initial questionnaire that estimated their level of knowledge, the men who had the most and highest quality of information had been most successful in finding a job and a higher annual salary (1.4 for Whites and 2.9 for Blacks). It is interesting to find that the influence of LMI on salaries is even greater among ethnic minorities (Blacks in this study). This result would apparently support the importance of providing ethnic minorities with access to LMI.

The quantity and quality of information was also positively associated with level of education, intelligence and the socio-economic status of the individual's family. The study also showed that men who were raised in a large city or the suburbs of a large city had higher scores than men raised on a farm. On the other hand, while vocational counselling had a positive impact at the high school level, it may not be because it provided a better overall understanding of the labour market, but because it provided personalized information that was directly linked to the individual's needs.

The authors themselves identified several limitations of their study. The questionnaire administered to the participants to measure the quantity of knowledge about the various employment alternatives was not validated and there are many variables that can influence LMI even though they may not have all been considered in the study. Furthermore, the sample studied

was not clearly described and the content of the “occupational information” transmitted was not specified. The fact that the sample consisted exclusively of men and that the findings were separated into information about Whites and Blacks does not allow to determine whether the number of guidance counsellors per 100 students had a positive impact (0.93 for Whites and - 0.84 for Blacks). As the study was carried out between 1966 and 1968, it is worth asking whether the same results would be obtained today in the current context.

5. The Impact of LMI-related Products and Services

A study published in 2005 by the Department of Human Resources and Skills Development Canada (HRSDC), attempted to measure the impact of their LMI products and services on employment insurance clients. The products and services measured in this study were: Job Search Assistance (JSA), Job Bank, Job Postings and Electronic Labour Exchange (ELE), Information Products and Services and Individual Counselling. There were two components to the study, a survey of employment insurance clients on the one hand, and the use of the findings of the Canadian Out-of-Employment Panel survey (COEP) conducted by Statistics Canada⁵, on the other hand. These results were specifically used to measure the impact of counselling.

For the employment insurance clients’ survey, the data were gathered from a sample of 4,166 respondents. The findings show that approximately 70% of respondents who received employment insurance had reported having used LMI-related products, and Job Bank was identified as the most popular service (60%). Furthermore, 87% of users said that the LMI-related products and services had been useful (46.7%) or somewhat useful (40.5%). The authors concluded that LMI had a positive impact on reducing the period of unemployment, without being able to draw a clear conclusion on the length of this reduced period.

In the COEP sample, 65.1%⁶ of participants had been unemployed for periods ranging from 1 to 52 weeks, with 11.6% unemployed for 52 weeks or more, and the rest of the sample (23.3%) consisted of employed people. The study attempted to measure the impact of counselling on the group that was unemployed for 1 to 52 weeks. The results showed that counselling reduced the

⁵ On behalf of the Department of Human Resources Development Canada, Strategic Evaluation and Monitoring.

⁶ These results were not brought out clearly in the study, but deduced by means of statistical computations using figures available in the study report.

length of unemployment in the short term. Furthermore, the likelihood of ending the period of unemployment was most significant immediately following an intervention by a counsellor.

These results are a major argument demonstrating the impact of counselling on the job-finding process, but we have no precise data in this research that would enable us to measure the scope of the impact of LMI. It would therefore be appropriate to carry out a study that would give us a better understanding of this possible interrelationship.

The authors themselves identified some limitations to their study. They suggested that the fact that the survey sample of employment insurance clients came from only 4 regions limited the ability to generalize the results to all of Canada. Furthermore, as the sample did not include LMI users who had been receiving employment insurance benefits for more than 6 months, the assumption is that it would be possible for the respondents not to remember the source of LMI, if it was obtained from a non-HRSDC source, or through the Internet from their homes. It is also important to mention that the response rate to the questionnaire was low (22.2% for LMI users and 20.5% for non-users), so that generalizations to the whole target population should be done with caution.

The study also suggests a positive effect of LMI on job searches carried out by individuals receiving employment insurance. On the other hand, the results do not lead to any conclusion as to whether LMI has an impact on those not receiving employment insurance. One can therefore not generalize the results to the general population. Nor do the results appear to apply to the influence of LMI on career decision-making; they would rather apply to the ability to obtain a job to meet specific obligations. And there is a significant difference between obtaining a job to live and a carefully thought-out career decision.

6. The Impact of LMI on the Economy and Society

There are studies that state that LMI has a positive impact on career decision-making and that argues that it makes a contribution to a better match between people and the work they do, which, according to Gillie and Gillie Isenhour (2003), has a positive impact on education, the economy and society in general. These authors consider such information to be part of several products, services and processes that facilitate occupational decision-making. They believe that career

information is incorporated into certain types of field interventions such as career education and counselling. There is no scientific evidence to confirm what they say, and their statements remain strictly theoretical.

Significant social and economic benefits are expected from the various guidance interventions, including LMI. In a report commissioned by the Organization for Co-operation and Economic Development (OECD) to evaluate their information and occupational guidance services, Maguire and Killeen (2003) point to certain direct and indirect positive benefits that can be expected from guidance.

In considering society, schools and other educational authorities, in addition to employers, we find in the Maguire and Killeen (2003) report that it is possible to receive positive benefits in terms striking a better balance between employment supply and demand; reducing shortages of skilled labour; lowering the rate of school dropouts and its associated costs; a decline in the frequency and cost of delinquency; reduced social exclusion; reducing the cost of unemployment; an increase in labour productivity and performance; reduced costs of health and crime; and an increase in taxation revenue.

7. Methods for Evaluating LMI

Herr (2001) presents a synthesis of the various perceptions of the costs and benefits of career development interventions in 14 countries. There are unfortunately no empirical results for this study. The situation is described from the standpoint of the practitioner, according to Herr's point of view (2001). In describing a way to analyze and measure the costs and benefits of guidance, the author refers to the ratio between the costs of delivering services to various populations for specific purposes to the economic and sometimes social benefits stemming therefrom. These benefits may accrue to those who receive services directly and who are the subject of interventions, or less directly, to educational institutions, employers, governments or society as a whole. The economic benefits to the client may be measured in accordance with their ability to hold a higher paying job, to reduce periods of unemployment, to better harmonize their interests and skills with the job they choose, and to stay longer in specific jobs. On the other hand, according to a literature survey carried out by Grubb (2002) to evaluate the role of markets and public authorities with respect to occupational information and guidance, it is virtually impossible

to put a figure on spending or to measure the amount of effort carried out, because in most countries, information and guidance are closely integrated into the follow-up to the educational process and into government employment and placement services.

According to Gillie and Gillie Isenhour (2003), occupational information is built into systems, processes and networks. The more the context becomes complex, the greater the value and impact of information. It is difficult to measure return on investment, and as with any other social phenomenon, it is difficult to evaluate all the efforts made with respect to career development, or with respect to the benefits that stem from it. It is also difficult to generalize the benefits from one population to another, because the number and intensity of interventions vary, just as the professionals who intervene may vary, because we cannot know their level of training and experience. Also noteworthy is the fact that most researches use samples of students who are at the high school or university level in the United States, and that generally, these studies apply to specific populations and contexts that make generalizing the results difficult.

CONCLUSION

All of the studies on computer-assisted programs reached similar conclusions: such programs have many positive effects on career choices decision-making. Other findings indicated that interaction with a computer-based program facilitates the decision-making process for any major decisions concerning education. The vast majority of subjects say that the information they received through a computer-assisted program was useful in planning their future or making educational or occupational decisions. On the other hand, just over half the participants said they intended to use this type of program in the future.

Other studies demonstrated a significant increase in the impact of LMI when it was combined with advice from a counsellor. Moreover, some researchers say that this information can increase the level of certainty about a career decision when the use of a computer is combined with intervention by a counsellor. These statements were confirmed by other research, which demonstrated that LMI has an impact on career development, but that its impact is virtually non significant unless transmitted through the intermediary of a counsellor or with counselling.

An individual's capacity to process LMI is also a subject of interest to researchers, who point out that simply receiving a great deal of information does not necessarily enable people to discriminate better between different occupations. Indeed, too much information can cause confusion, or even prevent action, because the individual may not be able to process all of the information received. Therefore, it seems that occupational information with a relatively simple level of cognitive complexity has more of an impact than information with a higher level of cognitive complexity. We may be led to think that understanding LMI requires prior knowledge to allow individuals to use it. Furthermore, it is important to point out that bias or erroneous representations create a barrier that precludes users from modifying or acquiring LMI related knowledge.

From another standpoint, it seems that more and better information has a positive impact on successfully finding a job and on obtaining a higher annual salary. Lastly, there is a positive impact of LMI on job searches for people receiving employment insurance, and it even reduces the length of benefits in the short term.

As this report shows, most studies on LMI go back to the 1970s and early 1980s, at a time when information technology was generating a great deal of interest in the research world. There is also very little literature about LMI on its own, and there are no studies that appear to investigate its direct contribution to career decision-making.

It is also important to take into account the fact that few studies focus on adults, except those on clients of government employment services. Indeed, most studies use samples that consist of high school and university students, which limits the ability to generalize results. Because of the limited number of studies carried out in Canada, we have to rely on American or British data, which may not be representative of Canada's population and its needs given the specific socio-economic context.

However, the *Canadian Research Working Group for Evidence-Based Practice in Career Development* is currently working on studying the impact of career services in Canada. One of the questions included in a study currently under way focuses on the impact of LMI on clients from various environments or agencies. Unfortunately, it is impossible at this time to know whether this variable will be isolated in order to measure the real impact of LMI on the career decision-making process.

Although the studies surveyed in this literature review bring out a variety of findings about the positive impact of LMI on career decision-making, this report has noted a variety of methodological limitations that qualify their scope. Furthermore, the fact that very few studies tend to isolate LMI to compare it to other variables (only one study mentioned in this review) shows that it is difficult to assess the impact of LMI on individual's career development.

Lastly, a terminological problem makes it difficult to complete a rigorous and critical literature review of the impact of LMI on career development. The indiscriminate use of various terms by authors and their failure to define them to refer to interrelated contents causes ambiguity. In fact, when a study does not explicitly or accurately define the concepts or items being used, how can one determine the extent to which it is targeting LMI? Although we can suppose that the terms *occupational information*, *vocational information*, *career information* and *labour market information* share certain areas in common, the determination of these areas can only be done by the authors themselves.

RECOMMENDATIONS AND POSSIBLE FOLLOW-UP ACTION

The mission to provide people and organizations with reliable and up-to-date information about the labour market requires considerable human and financial resources by governments. Although the dissemination of LMI involves cost, the literature review that we have carried out brings out various LMI impacts. On the other hand, the identified impacts of LMI only affect certain dimensions of the potential impact on the career decision-making process. As virtually all of the research was conducted approximately 20 years ago, it does not consider the current socio-economic status or the greater access for clients to all types of LMI, in particular to information available on the Internet.

With respect to the economic impact of LMI, although one research project mentioned possible savings in terms of employment insurance, no conclusions about the magnitude of the effect were suggested. Likewise, it is impossible to determine the impact of disseminating LMI on the education budget if the education progress could be streamlined more.

In the era of the information society, with due regard to the significant amounts of money invested by governments to provide people and/or organizations with useful information, it becomes urgent to look into the real impacts of LMI investment. In order to do this we suggest:

- To conduct a study specifically on the impact of LMI, with this variable isolated;
- To conduct this study with a sample that would allow the generalization of the results to the general population;
- To develop more valid methods (internal and external validity) to measure the impact of LMI considering the uniqueness of paths followed by individuals with or without a project;
- To study the career decision-making process from the perspective of the cognitive difficulty involved in understanding LMI, recognising that the purpose of processing LMI is to build, maintain and transform representations to help individuals navigate the labour market more efficiently.

Like Watts (1999), we found three possible approaches to evaluating LMI findings. The first refers to the individual, with results gathered following an LMI intervention and frequently designated as “learning results”, which are immediate; the second, to organizations where the findings are referred to as something like “educational effectiveness” and which are often felt in the medium term; and the third, to society, where results are referred to as “economic and social benefits”, and are usually felt over the longer term. From this standpoint, the author argues that the length of the period over which the results have been measured is of the utmost importance, because it could be argued that it is in the long-term results for the individual, the organization and society that the true benefits of LMI will likely be felt. However, an appropriate longitudinal study, which would be desirable, is likely to be too vast in view of the timeline and budget available and would not make it possible to gather data that would be immediately relevant to decision-makers. This underscores the need to work over a period that would make it possible to estimate long-term effects (Maguire and Killeen, 2003).

That being the case, it would be desirable to use LMI impact variables that may be described as intermediary, such as bio psychosocial factors, which contribute to people’s career development. We could explore how LMI contributes to self-esteem, to adaptation strategies, to the feeling of personal effectiveness and perceived control, to better using the network (social support), to the decrease of psychological distress and anxiety, etc. Several studies demonstrated that these factors act upon and contribute to the success of occupational counselling, guidance, redirection, integration, reintegration, and adjustment and readjustment. This would make it possible to identify them as indicators of benefits, both for individuals and society in general, at the economic level in particular. Killeen *et al.* (1999) believes that changing attitudes and learning results are the precursors of economic benefits. For Watts (1999), one of the factors involved in changing attitudes occurs when an individual makes a career decision. Maguire and Killeen (2003) believe that job searches and other decisions that are based on enhanced information contribute to an individual’s success in a career. According to them, workers thus become more effective and there is a higher level of complementarity between supply and demand on the labour market. They further believe that educational and occupational decisions are more likely to be good ones and to lead to constructive plans.

One particular question by Herr (2001, in Killeen *et al.* 2003) strikes us as an important one to mention in the context of what concerns us in this literature review: Is it possible to carry out detailed cost-effectiveness analyses in the absence of previous research on the effects of the various LMI interventions on a variety of populations that do not even concern the same career objectives. To measure these effects, it will be necessary to identify the factors that are to be used in measuring the impact of LMI. Furthermore, as the counsellor variable considerably increases the impact of LMI according to several of the studies consulted, it is important to pay closer attention to it, and to look in greater detail into its complexity. Indeed, rather than attempting to treat all counsellors as equal, as was done in the study by Evelyne, Conyne and Blakeny (1998), it would be better to document their specific skills. Many studies on psychology and counselling have demonstrated the considerable influence of the “counsellor” variable on the effectiveness of the intervention (Lecomte *et al.* 2004). It will be important to draw inspiration from these studies when the time comes to evaluate the impact of LMI if we are to acquire a better understanding of the effectiveness of the interventions done to encourage decision-making as part of a career decision-making process.

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