

How Do Executive Functions Affect Career Development of  
People with Intellectual Disability?

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### Abstract

Executive functions are usually regarded as essential skills for education and training. However, there is limited research in relation to how executive functions affect career development of people with intellectual disabilities in Hong Kong. In this project, 6 vocational rehabilitation professionals ranges from teacher, nurse, social worker, vocational counsellor and manager of an integrated vocational training centre were interviewed. Then, thematic analysis, under a 6 phases framework proposed by Braun & Clarke in 2006, was used to analyze the data to find out relevant and important theme in relation to executive functions, vocational training courses and implications on job finding and keeping of trainees with intellectual disabilities of an integrated vocational training centre. The results suggested that integration of executive functions in the vocational training courses could have positive implications on their employability, relationship improvement with co-workers and family members as well.

## How Do Executive Functions Affect Career Development of People with Intellectual Disability?

The aim of this research project is to investigate the implications of executive functions in the career development of people with intellectual disabilities (ID) who receive vocational training in Hong Kong. Professional staff of an integrated vocational training centre (IVTC) were invited to participate in the interview. IVTC is a training unit established by one of the leading non-government organizations (NGOs) in Hong Kong with governmental subsidy to provide vocational rehabilitation services to people with ID. There are two IVTCs established in Hong Kong. Both IVTCs are financially supported by the Social Welfare Department of the HKSAR government. Research participants were only invited to interviews from only one of the two IVTCs. The purpose of IVTC is to provide structured vocational training to trainees with ID in order to increase their employability in the job market. Therefore, both centers must successfully enable a certain number of trainees with ID to be employed openly every year. The effectiveness of vocational training may have significant impact of the employability of these trainees in the job market. However, there is no theoretical model on the role of executive functions in vocational training and career development of trainees with ID, especially in Hong Kong context. This research aims to explore insight into the role of executive function in vocational training for trainees of ID for better opportunity of open employment. Literature in relation to definition of people with ID and obstacles of career development are also reviewed. On the other hand, there were only two pilot schemes, organized by Education Bureau (EDB) from 2010 to 2013, implemented in only a small portion of primary and secondary schools in Hong Kong (Education Bureau, 2014). In general, the feedbacks from participating schools were positive. However, there is no such pilot scheme or systematic implementation of executive functions in special schools and IVTCs. Actually, both IVTCs are not under the supervision of Education Bureau, but social welfare department. Only one IVTC is planning to integrate executive functions into daily teaching and learning activities from 2020 and onward. As the implementation is still in the initial stage, it is thus better to analyze the data with qualitative method. A six phases framework of thematic analysis, proposed by Braun & Clarke in 2006, is adopted in this project. After the interviews, thematic analysis was used to analyze data collected. Then codes and themes have been identified. They were then reviewed and refined to develop thematic map which show the relationship among the most important themes to provide insight to improve vocational

rehabilitation service.

## Literature Review

### Definition of intellectual disability

In Hong Kong, intellectual disability (ID) usually refers to significantly below average intellectual ability with limitations in learning and adapting to issues in the daily life such as stress, social interaction, employment, etc. Education Bureau (2020) in Hong Kong defined students with ID as following “compared with peers of the same age, people with ID are relatively weak in abstract and logical reasoning, and with lower ability in knowledge integration and generalization. Therefore, they have difficulties in cognition. Moreover, they have deficits in the memory system, and rely heavily on rote memorization in the study process. They have relatively shorter attention span, and tend to be easily distracted. They have difficulty in comprehension and expression, limited vocabulary, simple sentence patterns, may have defective articulation. They also tend to have motor clumsiness and incompetence in perceptual motor skills; and poor adaptive skills: relatively weak in daily self-care and social skills”. Students with ID in Hong Kong, based on above definition, are known as special education needs (SEN) students. In general, students with ID usually have score of intelligent quotient (IQ) approximately range from 50 to 69. They are usually weak in attention, cognition, motor and adaptive skills.

In contrast to the definition used by EDB in Hong Kong, the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5)* is used to classify different levels of ID in the United States of America (USA). DSM-5 is published by the American Psychiatric Association (APA). It “classifies severity of ID according to the levels of support needed to achieve an individuals optimal personal functioning.” (Boat & Wu et al. 2015) DSM-5 defines intellectual disabilities as neurodevelopmental disorders that begin in childhood and are characterized by intellectual difficulties as well as difficulties in conceptual, social, and practical areas of living. (Boat & Wu et al., 2015)

In general, the government of HKSAR and non-government organizations (NGOs) in Hong Kong do not specifically claimed that they follow definitions of intellectual disabilities of DSM-5 to make diagnosis and/or to make decision to provide vocational rehabilitation service. However, undergraduate and postgraduate programmes, in relation to education, social work, counseling and psychology, of

local universities in Hong Kong usually cover content of DSM-5. Therefore, it is also commonly known in Hong Kong as well.

Severity of ID is usually expressed in score of intelligence quotient (IQ) which is commonly known in Hong Kong psychologist, employers, parents and teachers. Score of IQ is commonly expressed in numerical format and is easily understood as objective unit of measurement by the public. Therefore, definitions used by EDB as well as DSM-5, would be an easier way to represent the mild grade ID in contrast to other severity levels, i.e. moderate, severe, and profound. Focus of this research will be placed on people with mild grade ID. When this paper describes people with mild ID, readers should refer to both EDB and DSM-5 in the expression of IQ score. In general, grade of mild grade ID is expressed in IQ score ranges from 50 to 69. If the score falls behind 50, people with ID is graded as moderate or severe.

### **Theories of career development of people with ID**

*Career* is an individual sequence of job behaviours associated with work-related experiences and activities over the span of the person's life. It includes a subjective view of work, i.e. one's values, needs, and feeling which reflect one's reaction to work-related activities and depend on stages of career development and age. *Career development* basically is a "... process by which individuals progress through a series of stages, each of which is characterized by a relatively unique set of issues, themes, and tasks" (Greenhaus, 1987)

A model proposed by Donald Super gives an overview of an individual who goes through his/her life span in relation to career development. According to physical age, human being experiences a series of stages in the lifespan. It starts from growth stage, exploration stage, establishment stage, maintenance stage, till decline stage. (Career New Zealand, 2012) Young people in Hong Kong usually obtain jobs offer from desired organisation(s) and try to select appropriate job based on information provided by various sources such as Labour Department of the Government of the HKSAR. (DeSimone and Werner, 2012) Donald Super also has similar view. Young people aged 15 to 24 years old, usually reach Stage 2 of Super's model. This stage is known as "Exploration of Career", they would like to explore their career directions through classes, work experience, and hobbies. Therefore, job searching is the typical activity in this stage. They also make tentative choice and develop elementary skills for the first job. (Career New Zealand, 2012) In the stage of job searching, young adults are looking for a paid job. For people with ID, possible support may come from

young adult him/herself, family members, friends, employment agencies, teachers or schools. However, people with ID are known to have a much higher rate of unemployment than normal people. (Taylor, 1994) It may be a result of their inability to reach Stage 2 of Super's model. That is to say, they are still in Stage 1 and is known as Growth stage for normal people who are below 14 years old and are not ready for open employment. It is the stage for them to develop self-concept, attitudes and to understand general world of work. Further research could be made for the application of Super's model to people with ID. Systematic investigation of the career development of people with ID is still limited.

Szymanski and Cheryl (1996) introduced a conceptual model in relation to career development for people with or without disabilities to illustrate a dynamic interaction of the individual, contextual, mediating, environmental and output factors. In their model, seven principles were proposed for professional intervention to career development of people with disabilities. This model points out that career development is a life-long developmental process, in which job interests are affected by contextual and environmental factors such as the structure of the labour market. The process is also mediated by individual belief such as self-efficacy, and societal beliefs such as prejudice, discrimination and general role stereotypes. This model basically follows the Lewinian tradition of emphasizing the dynamic interaction of individuals and their environment (Szymanski & Cheryl, 1996). However, this model focuses on a higher/macro-level to understand the career development process. In a practical point of view, it may not be helpful for people with ID what should they do to advance in their career. However, Szymanski's model still provides an important framework to understand the interaction between individuals and environment in affecting the career development of disabled people. Factors such as employers' acceptance of people with ID as employee, cultural norms, government policy, parent's attitude, mastery of executive functions, psychological readiness of people with ID could all be important factors to consider.

Social cognitive career theory (Lent, et al., 1994, 2000) originally contains three overlapping models that aim at explaining the processes through which people develop vocational interests, make and revise occupational choices, and achieve varying levels of career success and stability (Lent, et al., 1994) Generally speaking, it emphasizes the interplay among self-efficacy beliefs, outcome expectation and personal goals. Strauser (2013) stated that self-efficacy beliefs are related to the interests, goals, and employment experiences (e.g., job finding and work stability) of persons with disabilities, both in United States and abroad. People with disabilities

usually have lower self-efficacy and outcome expectation. This reflects that they may encounter more difficult learning experience and environmental barrier than people without disabilities. We may consider if mastery of executive functions can improve self-efficacy and outcome expectation of people with ID, when they are in the early stages of career development.

Wehmeyer (1994) found that people with developmental disabilities in competitive employment demonstrated more *internal locus of control* than similar individuals in sheltered employment. Hensel, Kroese, and Rose (2007) also suggested that motivation is influential in determining whether people with learning disability could stay in their job for 3 months or above. Moreover, this study also found that aspiration for status may be particularly relevant for people with ID who feel that employment is an important way of establishing their worth and contribution to society.

The main theme of above-mentioned career development models is to understand that there are quite a lot of potential factors influence the career development processes of people with ID. However, people with ID usually have poorer executive functions than normal people. These executive functions may include response inhibition, self-regulation of affect, sustained attention, time management, etc. Therefore, they may encounter setbacks more frequently than people without ID. These setbacks will decrease their self-efficacy, motivation, self-image, outcome expectation, personal goal, etc. This situation is even worse, if they demonstrate higher degree of internal locus of control. Moreover, Chinese is the main constituents of the population in Hong Kong and there is limited research based on local context. It is obvious that parenting style of Asian couple is quite different from western counterparts. Different parenting style may lead to different development of the youth's self-efficacy, motivation, self-image, outcome expectation, personal goal, etc. Therefore, this may lead to different outcomes of open employment of disabled people. Future research should be made on these aspects.

### **Career development obstacles of people with ID in Hong Kong**

Li (1998) studied vocational aspirations of sheltered workshop workers with intellectual disability in Hong Kong. Those with disability did not want to try open employment due to a loss of confidence, family expectation and poor health. Open employment refers to the job opportunities offered by either profit-making or non-profit-making organization the labor market. Some also reported that their family

members did not want them to try open employment. Social workers in this study stated that support from family is essential for those with disability to be openly employed.

On the other hand, this study revealed that the *attitude of parents* was the major obstacle for sheltered workshop workers with ID to move on to open employment. The reason is that parents prefer security of sheltered workshop for their offspring to open employment. Moreover, there is no arrangement from the Government yet, if their offspring fall back from the job due to deterioration of health or emotional problems. Then, their offspring will lose the residential places and/or employment of the sheltered workshop. Moreover, parents and other family members are able to concentrate on their job to earn more money, if their offspring is able to stay in the sheltered workshop. Similar attitudes of parents can be found in integrated vocational training centre, in which parents reject open employment opportunity with same reason, even though there is job offer. The parents are uncertain as they do not know the work abilities of their offspring. They also worry about what will happen to their offspring in the open-employed workplace that the latter do not know how to cope with (Li, 1998).

Dr Elaine Chan Yee-man of the University of Hong Kong's department of politics and public administration, stated that the majority of school leavers from special schools in the 2014-2015 academic year either changed to vocational training services or classes in daily living skills (nearly 89 per cent). There were around 2 per cent of them went on further study, according to official statistics. Her research identified several obstacles to employment, including a lack of understanding by the employers and their concerns about getting their staff to accept the employee with ID or other disabilities. The study also found that many parents were overly protect their children with ID. (Chiu, 2018) Does attitude and over protection of parents leads to poorer executive functions of people with ID that in turn affect the latter's career development? Further research may be focus on this direction to improve parenting style and skills for children with ID in the future.

### **Executive functions**

*Executive functions*(EF), also called *executive skills*, refer to a family of top-down mental processes needed when you have to concentrate and pay attention, when going on automatic or relying on instinct or intuition would be ill-advised, insufficient, or impossible (Diamond, A., 2013, 2014; Burgess & Simons, 2005; Espy,



2004; Miller & Cohen, 2001). There are 10 executive functions identified by Dawson and Guare (2004). Response inhibition is the ability to think before an individual act. Self-regulation of affect is the ability to manage emotions in order to control behaviour. Task initiation is the ability to begin a task in a timely fashion. Flexibility is the ability to revise plan in the face of new information and obstacles. Goal-directed persistence is the drive to follow through t the completion of a goal. Planning is the ability to create a road map to complete a task. Organization is the ability to arrange things systematically. Time management is the ability to allocate time to complete a task before deadlines. Working memory is the ability to hold adequate information and to draw on past experience including knowledge and skills to complete a task. Metacognition is the ability to make self-evaluation to improve future performance.

In order to succeed in career, workers performance should achieve a satisfactory level as defined by their employers or supervisors. This is known as job performance. Together with “controlled behaviour”, workplace adaptation and job performance, employee should be able to achieve psychological contract. “Psychological contract” represents the mutual belief, perceptions and informal obligations between an employer and employee. (Noe, 2010)

Poor executive functions usually lead to poor productivity and difficulty to find and keep a job (Bailey, 2007). In order to have acceptable controlled behaviors for people with ID in the workplace, mastery of executive skills is a must. However, one of the most important psychological capacity is response inhibition (RI). It is an ability to think before the one act. Without such ability, it is difficult for individual to develop the whole set of executive skills. As Dawson (Dawson, 2004) pointed out that response or behavioral inhibition is the most important ability in the series of executive skills. Hong Kong is a commercial society. Competition is keen among businesses. Therefore, employer and employee response must quickly response to the fast-changing business environment, including customer’s needs, streamlined business processes with the use of advanced technology and complicated workflows, etc. Under such working condition, people with poor response inhibition may behave impulsively. It is easy for him to neglect the details of instructions made by employer or colleagues. The result may be lower awareness of occupational safety and health. On the other hand, people with poor cognition flexibility and working memory are difficult to cope with frequent changes of employers’ requirements in a dynamic working environment such as picking goods in warehouse and shopkeeping in retail outlets. Thus, mastery of EF skills is very important for people with ID to get open employment.

## Research Gap

From the literature review, EF is crucial to the success in school and workplace. However, there is only limited research in the contribution of EF of people with ID to vocation training and controlled behaviour in the workplace, especially in Hong Kong context. (Diamond, 2013, 2014; Burgess & Simons, 2005; Espy, 2004; Miller & Cohen, 2001; Barkley, 1997; Dawson & Guare, 2012) It is interesting to find out if the mastery of EF is able to help people with ID to develop to higher stage in Super's model. It is assumed that if people with ID is able to transit to higher stage, if they are able to get and keep a job in their life. The results of this research will provide important insight that if EF skills play important role in this process. Moreover, it is also important to investigate further how mastery of executive functions in the vocational training setting for people with ID in Hong Kong will result in improved "controlled behaviour" which may affect workplace adaptation, job performance and hence career development. In this project *controlled behaviour* is defined as behavior over which one has cognitive control. *Cognitive control* is the ability to control one's thoughts and actions. (Control (psychology), 2020) Findings of all these researches are important to help people with ID improve their employability for open employment.

## Research questions

1. What is the capability level of executive functions (EF) for trainees with ID in Hong Kong?
2. If executive functions or specifically response inhibition skills of trainee with ID is weak, how does it affect his job performance or even physical safety in workplace?
3. Does trainee's EF or specifically response inhibition skills reflect any strength and/or weakness of current IVTC vocational training courses?
4. Who is/are responsible to teach EF skills or specifically response inhibition skills?
5. On top of response inhibition, is there any other environmental stimuli, other EF skills, that affect the controlled behaviour of trainee with ID?
6. How Is EF related to better controlled behaviour?

## Research Methodology

### Participants of the research

Participants of this research are mainly vocational rehabilitation professionals of the IVTC. In the period of data collection, interviews have been arranged with 1 manager, 1 social workers(SW), 2 teachers, 1 nurse and 1 vocational counsellor (VC). The reason to interview various vocational rehabilitation professionals in this project is that they are important stakeholders directly or indirectly to design and provide vocational rehabilitation services to trainees of IVTC. *Manager* is responsible to supervise IVTC staff and to design the curriculum framework of the vocational training programme. *Teachers* are the person to teach trainees with ID daily. Besides providing medical support to employees and service clients, *nurse* is also responsible to teach person development courses in relation to hygiene and health occasionally. *Social worker* is responsible to handle emotion issues, to teacher personal development courses and conduct intake assessment. *Vocational counsellor* is responsible to match available job openings with potential trainees with ID. He is also responsible to develop employer network for available job openings and to provide support to employers, parents and employed trainees.

In general, the vocational training programmes, placements and job matching are formed into an integrated vocational rehabilitation service to trainees with ID to improve their employability. They were recruited by researcher's personal invitation and all of them participated in the research on voluntary basis. Since researcher is working in this IVTC, before the launch of the research activities, researcher had to obtain organizational approval from senior management of headquarter.

### Research materials

A set of research questions, printed on two-page paper, was used as a tool to collect data. Interviewees or participants of the research were recruited from the IVTC as mentioned above. Six interviews were conducted based on the proposed open-end research questions after office hours. Interviews were conducted in an individual meeting. Content are recorded with voice recorder. Pseudonyms were also used during the interview.

### *General interview protocol*

#### *Introduction of the role of student and project*

First of all, the role of researcher in the project is introduced to the interviewee. The aims of the project is also explained. Moreover, consent form is provided for interviewee to sign. It is also important in this stage to introduce the audio recording device and the confidential procedure in relation to data collected.

#### *Ice breaking questions*

Ice breaking questions are usually used to encourage interviewees to talk and get to know them better. Brief interviewee background is collected in this stage such as duration of working in IVTC, though researcher and interviewee are co-worker in the same unit. Interviewee may describe briefly his role in IVTC.

#### *Key questions*

Those key questions are used to collect the core information in this research. Therefore, the importance of EF skills in relation to trainees with ID, teaching strategies used to teach executive skills such as response inhibition, stakeholders involved in teaching executive skills, impact of the inclusion of EF skills in the curriculum, evaluation of the impact will be the key aspects of the inquiry. Moreover, probe questions will also be asked to further understand the situation. Below is the main questions that I used in the interview:

1. What is the capability level of executive functions (EF) for trainees with ID in Hong Kong?
  - Select several skills from executive functions clusters such as response inhibition(RI), emotional control, etc. that is/are related to vocational training. Give specific examples.
  - Which EF skill(s) is more important? Why? RI is expected one of the most important mental processes.
  - Is mastery of EF skills one of the admission requirements of service applicants? If no, does IVTC expect he can learn such skills from vocational training courses?

2. If executive functions or specifically response inhibition skills of trainee with ID is weak, how does it affect his job performance or even physical safety in workplace?
  - Is there any other consequences? Give examples.
3. Does trainee's EF or specifically response inhibition skills reflect any strength and/or weakness of current IVTC vocational training courses?
4. Who is/are responsible to teach EF skills or specifically response inhibition skills?
  - Is EF or specifically response inhibition skills already part of the current vocational training curriculum? If no, why not a part? If yes, how long it has been implemented? How these skills are taught?
  - Are there any specific teaching strategy?
  - Is the teaching strategy effective? If not, any further action?
  - Any expectation in relation to EF from parents and employers?
5. On top of response inhibition, is there any other environmental stimuli, other EF skills, that affect the controlled behaviour of trainee with ID?
  - If executive function, or specifically RI, training is well implemented, what kind of stakeholders, such as trainees, parents or employer, are affected?
6. How Is EF related to better controlled behaviour?
  - How do trainees have better controlled behaviour, if it is important to fulfilment of daily tasks?
  - How will controlled behaviour influence job performance and even achieve psychological concepts in the workplace?

### *Closing questions*

Closing questions were used to help interviewees to clarify and resolve any issue that may arise in the interview. For example, interviewee was allowed to ask questions.

### *Thanks and wrap-up*

When researcher closed the interview, thanks were sincerely given to interviewee. This does not represent the end of the interview. It is a polite expression of thank toward interviewee for their time and let them know how helpful they are. Researcher also asked if they had any further questions. Researcher left enough time

at the end for interviewee to raise additional questions, if needed.

*Specific questions for some groups*

Teachers are usually expected the key persons to conduct training activities in the IVTC. Researcher asked them more specific and follow-up questions in relation to teaching strategies. For example, in the interview with K instructor, specific questions in relation to limitation of teaching activities and teaching strategies used were asked. Moreover, follow-up question in relation to concept clarification is used in this dialogue as well.

*Interviewer: 3. 受訓者的執行功能水平是否反映了當前中心職業訓練課程的優點和/或缺點？*

*Interviewee: ... 唯一缺點就係唔知佢能唔能夠轉化到其他佢嘅真正工作環境。...*

*Interviewer: 咁即係關乎到係咪應用到啦同埋類化喇。*

*Interviewee: 冇錯。*

*Interviewer: 3. Does trainee's EF or specifically response inhibition skills reflect any strength and/or weakness of current IVTC vocational training courses?*

*Interviewee: The only limitation is that we don't know if students can transit learned knowledge and skills to workplace.*

*Interviewer: Is it related to "application" and "generalization"?*

*Interviewee: Exactly.*

*Interviewer: 4 c. 是否有特定的教學策略？有效嗎？如果沒有，請採取進一步措施？*

*Interviewee: 都會用一個 REAP 嘅方法同學生啲做檢討，針對番個行為做番啲矯正，*

*Interviewer: 4 c. Are there any specific teaching strategy? Is the teaching strategy effective? If not, any further action?*

*Interviewee: Power questioning "REAP" will be used to help student to review and adjust their behaviour.*

REAP stands for "Review, Evaluate, Anticipate and Planning". It is the approach suggested by Education Bureau in 2014 to motivate trainees with ID to review and hopefully to change their inappropriate behaviour. This is also an approach of powerful questioning to encourage trainees with ID to review recent behaviour, to evaluate if the behaviour is appropriate or not, to anticipate what should be do next

time, and to plan how to achieve the appropriate behaviour.

## **Procedures**

### *Recruitment method*

Internal staff of IVTC were recruited by personal invitation. Managers, social workers, teachers, instructor, and vocational counsellor were invited for interview. As interviews were conducted outside office hours, it inevitably increased the difficulty of recruitment.

### *Interviews*

All interviews were conducted from 7<sup>th</sup> September 2020 to 7<sup>th</sup> October 2020. Each interview was completed within one hour in non-office hours. All interviews were conducted in face-to-face mode in a meeting room of IVTC premises. It provided a better environment for audio recording.

Since Cantonese is mother language in IVTC setting and all staff are local residents of Hong Kong, all interviews were thus conducted in Cantonese. Moreover, note-taking was also used to record the data. All data collected were transcribed by verbatim. Each interviewee signed the consent form, before the commencement of interview and agreed with use of audio recording during the interview process. Pseudonyms were used in all audio recordings. Before the end of interview, each interviewee signed a debriefing form as well.

## **Data analysis and results**

After data collection, thematic analysis was used to turn data into important information. Thematic analysis is “a method for identifying, analyzing, and reporting patterns (themes) within data.” (Braun & Clarke, 2006) A six phases framework, suggested by Braun and Clarke in 2006, is used: i) familiarizing with data; ii) generating initial codes; iii) searching for themes; iv) reviewing themes; v) defining and naming themes; and vi) producing the report.

In the first phase “familiarizing with data”, data were collected from different media such as meeting notes or audio recording files. All data were then transcribed verbatim into text. The textual notes were required to be read several times until next

phase. In the second phase “generate initial codes”, preliminary “key words” in relation to the study were identified and recorded. In the third phase “searching for themes”, those “key words” were collated into individual possibly related “themes”. In the fourth phase “reviewing themes and fifth phase “defining and naming themes”, preliminary thematic maps of the analysis was developed. These maps and themes were then continuously refined to form the overall story that the analysis tells. In the last phase, the report was written to tell the result of the analysis.

Moreover, Braun and Clarke (2006) identified 10 advantages of thematic analysis. They are 1) thematic analysis is flexible; 2) it is a relatively easy and quick method to learn and do; 3) it is accessible to researchers who have little or no experience of qualitative research; 4) results are generally accessible to educated general public; 5) it is a useful method for working with participants as collaborators; 6) thematic analysis as a kind of qualitative research which can usefully summarize key features of a large body of data; 7) it can identify similarities and differences across the data set; 8) it can generate unanticipated insights; 9) it allows for social and psychological interpretations of data; and 10) it can be useful for producing qualitative analyses suited to informing policy development. (Braun & Clarke, 2006) As all research participants invited for interview are working in the same IVTC and it is the first time to systematically implement in vocational training setting of trainees with ID, collaboration between researcher and participants are needed and generation of unanticipated insights are expected. Therefore, thematic analysis is a reasonable method of analysis in this research project.

### *Familiarizing with data*

All Cantonese recordings of interviews were transcribed into text. Initial ideas and key words were highlighted in the softcopy of the textual transcript in Chinese language.

### *Generating initial codes*

Initial codes, i.e. interesting features of the data, such as response inhibition (RI), working memory (WM) are found across the entire data set. They were collated in a systematic fashion to identify if any important relationship are found among each other. Below is a piece of “data extract” for illustration:

#### *1. a. 香港受訓學員的執行功能(EF)水平如何?*



一般係屬於低嘅水平啦。就係受到佢哋智能嘅發展嘅限制。

*1. a. What is the capability level of executive functions (EF) for trainees with ID in Hong Kong?*

*In general speaking, EF capability level of trainees with ID is low. It may be limited by their deficient intellectual development.*

Therefore, initial codes from the above data extract are “*low EF capability level of trainees with ID*” and “*limitation of intellectual disabilities*”.

Six interviews were conducted from 7<sup>th</sup> September to 7<sup>th</sup> October 2020. A number of codes was initially generated. They include seminar for parents and employer, visual cue, REAP(Review, Evaluate, Anticipate, Planning) strategy, teaching and learning activities, teaching practice based on past experience, EF awareness, low or high level of EF skills, EF skills related vocational training, EF skills related to job performance, employers, trainees with ID, teachers, parents, external environment, temperature, peer trainees, peer co-workers, public, job performance, controlled behaviour, psychological contract, formal and informal admission requirements, age of service applicants, self-regulation of affect, intellectual disabilities, ADHD, ASD, stakeholders.

#### *Searching for themes*

Codes were then collated into potential themes. All data that relevant to each potential theme were gathered. In the interview text, identified executive function skills, i.e. all eleven “initial codes” mentioned above were collated into a potential theme as “executive function skills”.

***b. 從執行功能組別中，選擇幾種與職業訓練(VT)有關的技能，例如反應抑制 (RI)，情緒控制等。給出具體的例子。***

*其實同反應抑制都有相關的，工作記憶啦因為佢哋都要執行一啲工作上嘅步驟，情緒管理係比一般人弱啲嘅。情緒管理啦，可能會情緒失控或者畀人講下就會差啲。*

*b. Select several skills from executive functions clusters such as response inhibition(RI), emotional control, etc. that is/are related to vocational training. Give specific examples.*

*In fact, response inhibition and working memory are closely related to implement work procedures. Self-regulation of affect or emotion management is also*

*important to vocational training (VT). Trainees with ID has poorer self-regulation of affect, especially when someone revile on them.*

A number of executive function skills were identified from the interviews that were important for the vocational training and employers' concern. They are listed on the basis of importance: *response inhibition, self-regulation of affect, working memory, time management, sustained attention, organization, flexibility, goal-directed persistence, planning/prioritization, task initiation and metacognition*. The most important EF skills is *response inhibition*. The next most important is self-regulation of affect. The least important is *metacognition*. This priority was found from the interview in which response inhibition was raised most frequent and metacognition was only raised once. All identified EF skills can be reduced to one themes known as "*EF skills*".

Other themes included teaching strategy, visual cue, REAP, teaching experience, EF awareness, level of EF skills, EF skills related vocational training, EF skills related to job performance, employers, trainees with ID, teachers, parents, external environment, temperature, peer trainees, peer co-workers, public, job performance, controlled behaviour, psychological contract, formal and informal admission requirements, age of service applicants, intellectual disabilities.

### *Reviewing themes*

All identified themes were reviewed and internal homogeneity as well as external heterogeneity were considered. A thematic map has been refined in this phase. There was awareness of EF skills as the starting point. It had relationship with admission requirement of the intake assessment and pedagogical characteristics of teaching and learning.

Appropriate pedagogical characteristics of teaching and learning means daily pedagogical activities may include 3 other main themes. They are teaching strategy, person-to-teach, curriculum design and content. All of them will contribute to the effectiveness of EF training on top of trade skills. Moreover, admission requirements of the intake assessment may imply that service applicants who have satisfied with the admission requirements may have greater opportunity to have better effectiveness in the EF training skills. It is because when the admission requirement, pedagogical characteristics of teaching and learning are consistent, it is expected that a consistent outcome could be expected. Therefore, EF training effectiveness could be affected by

admission requirement and pedagogical characteristics of teaching and learning.

Social worker in the interview also stated that:

*我認每一個訓練都有佢個限制喺度嘅，只不過我哋可唔可以用有限嘅時數嘅 training 或者時間，喺兩三年裏面，...，可唔可以針對性地，老師掌握佢更加全面啲，... 可能嗰一班有兩三個同學佢哋嘅專注力可能差啲嘅，就喺某一啲部分加強呢兩個同學嘅專注力訓練，*

*I think that every training has its limitation. However, we may use limited teaching hours or duration, let say within two to three years and teachers focus on strengthening sustained attention of those two to three identified students...*

Moreover, effectiveness of EF skill training may lead to 2 main themes. They are controlled and uncontrolled behaviours. They represent two different outcomes of trainees with ID in relation to their job performance in the workplace, and hence psychological contract.

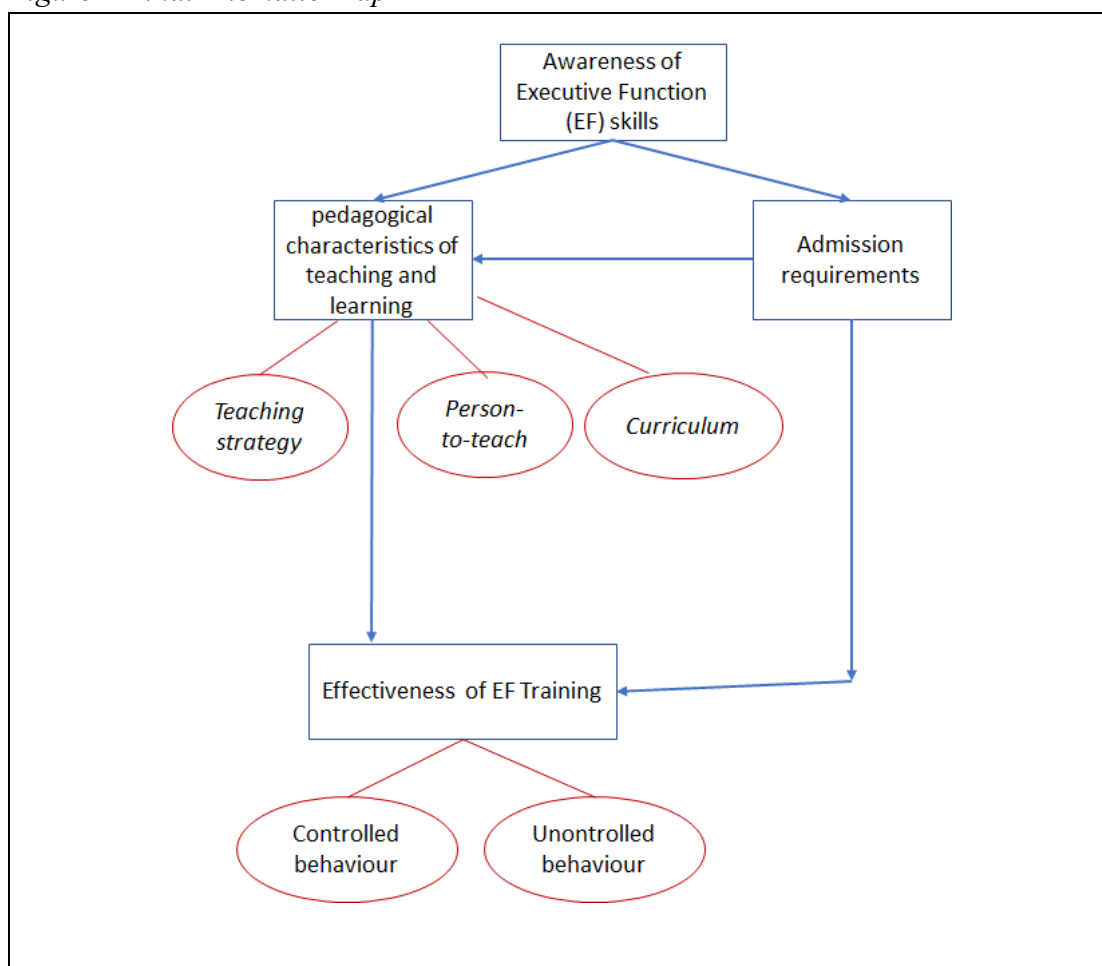
#### *Defining and naming themes*

In this phase, the *essence* of each theme is identified and they are organized into coherent and internally consistent account with accompanying narrative. Relationship among themes with each other is also considered. For example, “EF skills” theme were collectively suggested by professional staff of IVTC based on their job matching, teaching, counselling experience as well as understanding on the awareness of parents and employers. Therefore, name of “EF skills” theme should be renamed to “awareness of EF skills” theme. It represents how much they aware the existence of the skills and how importance of the EF skills for career development of people with ID. Due to the awareness of EF skills, management of IVTC decided to integrate them into curriculum of vocation training. Moreover, management also suggests that person-to-teach should include all people who have contact with trainee with ID. Person-to-teach inside IVTC may include teacher, social worker, nurse, occupational therapist, office staff in general office. Moreover, REAP is the central strategy used to teach EF skills in the centre. REAP strategy stands for review, evaluate, anticipate and planning. It is an effective and powerful questioning activity to help implementation of EF skills.

Three main themes are re-categorized into sub-themes. *Teaching strategy*, *person-to-teach* and *curriculum* of vocational training become sub-themes under main theme pedagogical characteristics of teaching and learning. The concept of

pedagogical characteristics of teaching and learning can encompass and represent all teaching and learning related talents, methods, activities and deliverables. Therefore, it is reasonable that teaching strategy, person-to-teach and curriculum of vocational training could be encompassed by pedagogical characteristics of teaching and learning.

Figure 1 Final Thematic Map



On the other hand, the outcomes of EF skills training should have two possible results. If the EF skills training is effective, trainees with ID should have controlled behaviour in the workplace or possibly at home or in the public. It is possibly that the employee with controlled behaviour as well as satisfied job performance, thus he or she may achieve psychological contract. Vocation counsellor described the expectation of common employers in the interview:

6. 執行功能與更好控制行為有何關係？受控的行為(*controlled behaviour*)如何影響工作表現，甚至得到僱主信賴(*psychological contract*)？  
我同意，因為僱主都係想要一個受控嘅員工，即係僱主可以放心交帶一樣

工作界呢一位員工，咁一個有受控行為即係控制到自己個員工先至得到僱主嘅信賴。咁先至達到僱主嗰個工作嘅期望。

*6. How is EF related to better controlled behaviour? How will controlled behaviour influence job performance and even achieve psychological concepts in the workplace?*

*I agreed with your point of view. Employer usually needs an employee with controlled behavior so that job tasks could be assigned to the latter without worry. That is to say employer only trusts those employee with controlled behavior who can meet the expectation of employer.*

Social worker had the same response in the same research question. He emphasized the importance of controlled behavior in the interview:

同意嘅，咁根據我嘅理解，受控嘅行為即係穩定性，係有影響嘅。絕對同意呢句嘅說話。

*Agreed. According to my understanding, controlled behavior represents stability, which has positive impact. Absolutely agreed with this statement.*

However, if the EF skills training is *ineffective*, trainees with ID may have poor job performance in the eye of employers due to uncontrolled behaviour. It is inevitably that the employee with ID will be difficult to keep his or her job.

*Producing the report.*

Final analysis and write-up of the report with a set of fully worked-out themes began in this phase. The results suggested that executive skills are significant in vocational training for the job finding, job keeping and sustainable career development of people with ID in Hong Kong. The four main themes, awareness of EF skills, admission requirement, pedagogical characteristics and EF training effectiveness were discovered. A thematic map was created to show the potential interrelationships among these themes. This thematic map can provide important insight for future optimization of vocational training program, which in turn will cater the specific needs of the job and/or requirements of the specific employer.

### **Ethical concern of the research**

The most critical ethical concern of this project is the data collected in the interview. During the interview, all identities were treated anonymously.

Pseudonyms were used in all audio recordings. Therefore, data collected were treated with full confidentiality and that if published, it will not be identifiable as theirs. Data in the form of digital files were encrypted by password and data in the form of paper files were locked in the file cabinet. All raw data can then only be accessed by student and supervisor. Basically, All raw data, including audio records and handwritten notes, will be destroyed one year after the completion of this research project. people with ID, i.e. the trainees of the IVTC, who could be regarded as vulnerable were not involved in all interviews.

On the other hand, the main procedures were clearly explained to research participants in advance, so that they were informed about what to expect. Research participants were required to sign the consent form before the interview. They were allowed to withdraw from the interview at any time and any reason. Moreover, researcher gave research participants the option of omitting questions they do not want to answer. Research participants of this project do not receive any non-monetary or monetary return.

### **Implications of the Research**

The finding provides insight in relation to implementation of executive function to improve the vocational training for trainees of ID for better opportunity of open employment. As has been found from literature that obstacles of career development of people with ID come from misunderstanding of employer who may not have confidence on their job performance, uncontrolled behaviour, lack of social skills to handle unexpected behaviour of people with ID and acceptability of co-workers. This research told the story that effective EF skills integrated in the vocational training programme may help to nurture the controlled behaviour of employee with ID. Since they can control their behaviour, they can work in a stable emotion, learn trade skills better, concentrate on their job, to be more acceptable by co-workers. In general speaking, their employability could be improved.

Moreover, when EF skills of trainees with ID have been enhanced, they may have better controlled behaviour at home. Their conflicts with family members are believed to have substantial decrease. It will then result in better relationship with parents as well as other family members. As social worker in his interview had raised that:

5 b. 如果學員有良好的執行功能訓練，那麼會影響那些持份者，例如受訓學員，父母或僱主？有嘅，教職嘅同事啦，跟進工作嘅同事啦，社工喇，家長啦，其實佢哋都全部都係得益人士嚟嘅，其實最大得益嘅，係同學做得到，同學自己係最大嘅得益者。

5 b. *If executive function, or specifically RI, training is well implemented, what kind of stakeholders, such as trainees, parents or employer, are affected? All teaching staff, other staff who help to follow up with trainees with ID, social workers, parents are all positively affected. In fact, trainee with ID is the one who is the largest beneficiary, if they can master these EF skills.*

### **Limitations of the Research**

In Hong Kong, there are two IVTCs. In this project, data was collected via interviews only from only one IVTC which is located in Kowloon. The other one is located in Tai Po. It is better to collect data from both IVTC in the future research in order to have larger sample size. Future research could also explore the perspectives of parents and employers. As has been found in literature review, obstacles against open employment of trainees with ID include lack of confidence of parents on their children and misunderstanding of employer. Therefore, it is suggested that both of them must be included in the future research in order to better understand their considerations in relation to the career development of people with ID.

Moreover, “who to teach which skill(s)” remains controversial. In this project, the policy of IVTC stipulated that social worker is responsible to teach all EF skills to teachers. When teachers theoretically understand all of them, they are responsible to integrate all EF skills in their curriculum and daily teaching and learning activities. As teacher K described that:

... 社工入班教導師如何教執行功能。跟住社工離開啦，由導師自己去教執行功能。

...*Social worker instructs teacher in the daily class how to implement EF skills. When social worker leaves the classroom subsequently, teacher take over again the teaching and learning activities with EF skills.*

However, a better alternative based on division of labour or specialism could be adopted. As social worker in the interview pointed out that:

... 堅持達標，抑制反應，情緒管理，REAP 可能係社工嘅角色可能就會擔當

多啲，至於落到去一啲實務實操日常流程可能會用到嘅，例如工作記憶，持久專注，任務展開，排優次，組織呀，時間管理，靈活變通呀，我都覺得係老師喺個範疇可以做多啲。

*Social worker may be better to teach goal-directed persistence, response inhibition, self-regulation to affect and REAP. For daily routine of trade skills, teachers are able to play a better role to teach working memory, sustained attention, task initiation, planning/prioritization, organization, time management, flexibility.*

Moreover, one of the limitations of qualitative research is subjectivity. In the future research, evidence-based quantitative research should be conducted to justify the correlation and causal relationship among important themes (variables) are needed. For example, after a few years implementation of EF skills in vocational training setting, there are a number of IVTC graduates who have learned these skills. Correlation study can be conducted to see if a positive or negative relation can be found in their employability and EF skills. Moreover, controlled experiment could be used to justify the causation between person-to-teach and controlled behaviour/effectiveness of EF training. The experiment may contain two groups. Experimental group of trainees who receives EF skills training solely conducted by teachers/workshop instructors and controlled group of trainees who receives EF skills training by different staff with different professional profiles. It may find out which specific category of person-to-teach can provide higher or lower effectiveness of specific EF skills training.

### Suggestions

As the intake assessment conducted by social workers in IVTCs may identified those weakness of EF skills of service applicant, these information is very important for those service applicants to improve their employability in the market. Unfortunately, social workers cannot follow up with those service applicants who failed in the intake assessment. As stated by social worker in the interview:

...反而係一啲人唔到我哋中心服務嘅申請人，就唔知道佢哋邊一方面係欠缺咗，咁就有咗後面嘅跟進工作啦，...

*...Those who failed in the intake assessment of service application do not know which kind of EF skills they lack of. Therefore, no suitable follow-up service can be provided to them...*



Therefore, detailed information of failed service applicants in relation to EF skills are kept in a certain period of time, says 6 months. Failed service applicants, who are accepted by other social service unit or training schools, are reminded that IVTC can provide such information to these service units with their permission. This arrangement may help to enhance the EF skills level of those service applicants who failed in the IVTC intake assessment.

### Conclusion

Interviews have been conducted to collected data from vocational rehabilitation staff from IVTC which is under the subsidy of social welfare department. Data were then collated and analyzed with thematic analysis. From the analysis, a clear relationships were found between awareness of EF skills, pedagogical characteristics and EF training effectiveness. If EF skills of people with ID can be improved through vocational training, they are able to learn trade skills better as well as critical soft skills to enhance their employability. However, further research should be made in order to increase research scope, to provide evidence based findings and to understand more precise causation among variables.

### References

- 教育局 (2014) 。《執行技巧訓練：指導計劃》。香港：香港特別行政區政府。  
<https://www.edb.gov.hk/tc/edu-system/special/resources/adhd/COPES%20Manual/index.html>
- Bailey, C.E. (2007). Cognitive accuracy and intelligent executive function in the brain and in business. *Annals of The New York Academy of Sciences*. 1118(1). pp122–41.
- Barkley, R. A. (1997). *ADHD and the nature of self-control*. Guilford Press.
- Boat, T.F. & Wu, J.T. et al (2015). Mental Disorders and Disabilities Among Low-Income Children. "Clinical Characteristics of Intellectual Disabilities". Washington (DC): National Academies Press (US).  
<https://www.ncbi.nlm.nih.gov/books/NBK332877/>
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*. January 2006. 3(2):77-101

[https://www.researchgate.net/publication/235356393\\_Using\\_thematic\\_analysis\\_in\\_psychology](https://www.researchgate.net/publication/235356393_Using_thematic_analysis_in_psychology)

Burgess, P.W. & Simons, J.S. (2005) Theories of frontal lobe executive function: clinical applications. In: Halligan PW, Wade DT, editors. *Effectiveness of Rehabilitation for Cognitive Deficits*. Oxford Univ. Press; New York:. pp. 211–31. [https://books.google.com.hk/books?hl=zh-TW&lr=&id=V\\_dsKrSb7usC&oi=fnd&pg=PR8&ots=JJkIOcF2KM&sig=W1tRBVLYyEUj\\_5tNDV6yxDrzR4U&redir\\_esc=y#v=onepage&q&f=false](https://books.google.com.hk/books?hl=zh-TW&lr=&id=V_dsKrSb7usC&oi=fnd&pg=PR8&ots=JJkIOcF2KM&sig=W1tRBVLYyEUj_5tNDV6yxDrzR4U&redir_esc=y#v=onepage&q&f=false)

Careers New Zealand. (2012). Donald Super Developmental self-concept. <https://www.careers.govt.nz/assets/pages/docs/career-theory-model-super.pdf>

Chiu, P. (9 Dec, 2018) How can Hong Kong help the intellectually disabled find work? South China Morning Post <https://www.scmp.com/news/hong-kong/society/article/2177048/how-can-hong-kong-help-intellectually-disabled-find-work>

"Control (psychology)", Wikipedia. 6 June 2020  
[https://en.wikipedia.org/wiki/Control\\_\(psychology\)](https://en.wikipedia.org/wiki/Control_(psychology))

DeSimone, R.L. and Werner, J.M. (2012). *Human Resource Development* (6th ed.). International Edition. Cengage South-Western.

Diamond, A. (2013) Executive Functions. *Annual Review of Psychology*. 64: pp.135–168. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4084861/#R184>

Diamond, A. (2014) Want to Optimize Executive Functions and Academic Outcomes? *Minnesota Symposium on Child Psychology*. 2014; 37: pp205–232.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4210770/>

Dawson, P. & Guare, R. (2004) *Executive skills in children and adolescents : a practical guide to assessment and intervention*. Guilford Press

Dawson, P. & Guare, R. (2012) *Coaching students with executive skills deficits*. Guilford Press

Education Bureau (EDB) of HKSAR (2020). "How to support Children with

Intellectual Disability". Education Bureau.

[https://www.edb.gov.hk/attachment/en/edu-system/special/resources/serc/download/id\\_e.pdf](https://www.edb.gov.hk/attachment/en/edu-system/special/resources/serc/download/id_e.pdf)

Espy, K.A. (2004). Using developmental, cognitive, and neuroscience approaches to understand executive control in young children. *Developmental Neuropsychology*. 26: pp.379–84.

Greenhaus, J. (1987). Career management. Hinsdale, IL: Dryden Press.

[https://books.google.com.hk/books?id=FQoPkp7\\_PzIC&printsec=frontcover&q=inauthor:%22Jeffrey+H.+Greenhaus%22&hl=zh-TW&sa=X&ved=2ahUKEwj3Z7qnZjtAhVFJaYKHRCIBGgQ6AEwAXoECA MQAg#v=onepage&q=career%20development&f=false](https://books.google.com.hk/books?id=FQoPkp7_PzIC&printsec=frontcover&q=inauthor:%22Jeffrey+H.+Greenhaus%22&hl=zh-TW&sa=X&ved=2ahUKEwj3Z7qnZjtAhVFJaYKHRCIBGgQ6AEwAXoECA MQAg#v=onepage&q=career%20development&f=false)

Hensel, E., Kroese, B.S. & Rose, J. (2007). Psychological Factors Associated with Obtaining Employment. *Journal of Applied Research in Intellectual Disabilities*. 20, 2, p175-181.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance [Monograph]. *Journal of Vocational Behavior*, 45 , 79– 122. In Strauser, D. R. *Career Development, Employment, and Disability in Rehabilitation : From Theory to Practice*, Springer Publishing Company, 2013.

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, 47, 36– 49. In Strauser, D. R. *Career Development, Employment, and Disability in Rehabilitation : From Theory to Practice*, Springer Publishing Company, 2013.

Li, E. P. (1998) Vocational aspirations of sheltered workshop workers with intellectual disability in Hong Kong. *Journal of Intellectual Disability Research*, 42(3): 208-217

Miller, E.K, Cohen J.D. (2001) An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*. 24: pp. 167–202.

<https://www.annualreviews.org/doi/abs/10.1146/annurev.neuro.24.1.167>

Noe, R. (2010). *Employee training and development*. McGraw Hill Education.

Strauser, D. R. (2013) *Career Development, Employment, and Disability in Rehabilitation : From Theory to Practice*. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/hkpl-ebooks/detail.action?docID=1394868>.

Szymanski, E. M. & Cheryl, H. M. (1996) Career Development of People with Developmental Disabilities: An Ecological Model. *Journal of Rehabilitation*, 62, 1, 48-55

Taylor, H. (1994, May) N.O.D. Survey of Americans with disabilities : Employment related highlights. [special advertising section]. *Business week*. In Szymanski, E. M. & Cheryl H. M. (1996) Career Development of People with Developmental Disabilities: An Ecological Model. *Journal of Rehabilitation*, 62, 1, 48-55

Wehmeyer, M. L. (1994). Employment status and perceptions of control of adults with cognitive and development disabilities, *Research in Developmental Disabilities*, 15, 119-131.