

# EGUIDE

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# Introduction

The EGUIDE career guidance tools are an assessment system specifically developed to analyse a person's vocational interests, personality and specific aptitudes. The tools were developed keeping in mind the needs of the Disadvantaged Job Seeker population and were brought together to overcome the barriers often faced by disadvantaged job seekers to traditional career guidance psychometric tools.

The EGUIDE framework has been constructed on the basis of three important components of self-awareness that can enable an individual to make a quality decision on their own career path, the components are, career interests, personality traits and specific abilities. The system is founded on the principles of the Person Environment Fit theory, which postulates that when a good match between the Person and the Job Environment is found, this benefits the individual by allowing the person to be more satisfied with their job / career, more able to cope with the demands imposed by the work/training, and more determined to succeed and become successful. This is in fact one of the main premises of career guidance and is an important aim to establish intrinsic motivation in an individual

The EGUIDE person profile is structured into three domains broken into 15 basic properties:

## **Career Interests**

- A: Realistic
- B: Investigative
- C: Artistic
- D: Social
- E: Enterprising
- F: Conventional

## **Personality Traits**

- A: Openness
- B: Conscientiousness
- C: Extraversion
- D: Agreeableness
- E: Stress Tolerance

## **Cognitive Ability Clusters**

- A: Verbal Reasoning
- B: Fluid Reasoning
- C: Visual Spatial Reasoning
- D: Perceptual Speed

# Development

## ***1.0 Introduction to Chapter***

This chapter discusses the background on which the EGUIDE Career Guidance tools were developed, explaining its history from abstract idea to tangible existence. This chapter will detail the following

### **1.1 Realising the need for the EGUIDE Tools**

### **1.2 EGUIDE Project Aims**

### **1.3 Research into existing tools**

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## ***1.1 Realising the need for the EGUIDE Tools***

All organisations dealing with the progression of disadvantaged job seekers use different methods/models of assisting the individual in making appropriate career and vocational training and educational choices. In many cases there are no clear guidelines for those working with this target group, there is little dialogue between organisations in terms of sharing of best practice, and often the individual makes a decision based on what training is available locally or within the organisation, rather than a decision based on the results of an objective and appropriate guidance process.

Guidance tools are mainly developed for use with students in post primary education, graduates, and job changers and as a development tool for organisations to enable employees to progress. Unfortunately, most commercial test publishers in Ireland and the partner countries tend not develop guidance tools for use with disadvantaged job seekers. Guidance professionals and those working with the target groups have had to adapt the use of commercial assessments for use with this group. This is often difficult and the essence of the assessment can be lost. In most cases the concepts and language used is of a different level and often aimed at a different culture (e.g. US based assessments). The contents of the assessments are often not relevant to the target group so in many cases the individual is trying to identify similar situations/activities and then proceed to answer the question. Along side this there is often an absence of established and validated normative data. This is due to the fact that the assessments have not been developed with this particulate target group in mind.

It was the experience of the EGUIDE project partnership that the range of available commercial assessments for use in career guidance with disadvantaged job seekers in the area of vocational training is very limited in terms of their appropriateness to the client group. Some of the preliminary findings from the EGUIDE Project emphasised the importance of appropriate assessment methods and tools for this client group. Therefore the EGUIDE project would develop assessments that could be used as generic assessments in any career guidance/mediation situation and could therefore, be developed upon as part of a Quality Assurance Framework for use with guiding this target group into vocational training, education and sustainable employment.

Findings from another EU funded project CHOICES indicated that the use of computer-based assessment where the concepts are presented in a written format, audio format and a visual/animated format are much more preferred by the target group than if these concepts are just based upon a paper and pencil format. It was also shown that a paper and pencil format could lead to anxiety induced by associations between the paper and pencil test and negative events experienced by the participant in school. Given these findings the project partnership felt that creating assessment tools that were available on the World Wide Web would give greatest usability to the client group and reduce anxiety associated with exams.

The findings of the CHOICES project also support the recommendation from the EGUIDE partners that tools specifically to facilitate the guidance of disadvantaged job seekers and those in and out of low skill employment, which can be used by all organisations who interact with this target group, are necessary.

## **1.2 EGUIDE Project Aims**

- The development of a Quality Assurance Framework for guidance into in initial training
- The design and development of a Battery of Guidance Assessments, which are specifically aimed at disadvantaged job seekers/those in and out of low skill employment. The assessments will be interactive computer based assessments with audio/visual aspects to ensure usability with the client group. This Guidance package will be developed based on the Quality Assurance procedures identified and will be used as a model to test the QA Framework.
- The design and development of an Web based framework within which the guidance tools can operate
- The development of e based training for Guidance and mediation practitioners, HR practitioners, Training and education practitioners, Employment service practitioners etc. who will assist the target group in the use of the system

### **1.3 Research into existing tools**

As part of the planning stages towards the development of the EGUIDE career guidance tools the partnership set about discovering what career guidance tools are used presently by practitioners for vocational guidance including both commercial and in-house assessments. A tool or assessment refers to a test or any procedure used to measure a factor or assess some ability/ies which can be used with disadvantaged job seekers/low skill employed which will elicit information about the individuals natural abilities and potential. The outputs from this research then formed part of the initial research report. A summary of the research and its implications follows.

A vast battery of tools e.g. intelligence, vocational, interests, aptitude, achievement tests exist and are in use, however whether these tools were appropriate and valid for the population in question was the main issue that was raised by mediators/counsellors and practitioners during the research phase. The tools that exist will not be listed here, as the list is too long. What can be talked about are the advantages of the tools for the target group and barriers faced by the target group with the tools that exist and how our new tool overcomes these barriers and harnesses these positives.

In the field of psychometric tools there exist two general categories. There are tools that examine the ability of a person to quickly find a solution to a task using multiple-choice responses; these tools are often referred to as ability/aptitude tools. There are also tools that measure self-reported behaviour and attitudes by asking respondents to evaluate a statement using ordered graduated scales, these tools are often referred to as Likert Scales. The tools that were researched by the EGUIDE team fall into these two categories, thus the advantages and disadvantages that were found in the various existing tools are broken into these categories in table 1.1 and table 1.2 below.

The partnership therefore needed to keep the strengths and challenges of existing career guidance tools in mind during the development of the tools.

**Table 1.1: The positives and barriers of commercially available Ability/Aptitude tools for use with disadvantaged job seekers**

<b>Barriers</b>	<b>Positives</b>
Instructions difficult to read	All tools gave candidates an example item to try before the assessment began
Task examples often ambiguous	A few tools did not have a time limit but did measure total time taken
Task itself often irrelevant	Some tools used the internet as a medium for a assessment
Assessments all had time limits	The tools that use the internet produced automatic reports for the practitioner
Tools mostly were paper and pencil type	Some tools used non verbal imagery to test candidates
The paper based tools were tedious and difficult to score	
Language generally aimed at graduates or children	
Norm scores aimed at too high a level	
Testing environment often appeared cold and hostile	

**Table 1.2: The positives and barriers of commercially available Personality and Interest tools for use with disadvantaged job seekers**

<b>Barriers</b>	<b>Positives</b>
Instructions difficult to read	One or two tools attempted to use non-verbal methodology – imagery to depict statements
Aim of the tools often not explained properly to the participants	A number of tools used a short form of a longer questionnaire
Tools mostly were paper and pencil type	Some tools used the internet as a medium for a assessment
The paper based tools were tedious and difficult to score	The tools that use the internet produced automatic reports for the practitioner
Language generally aimed at graduates or children	
Most of the tools contained up to 220 sentences/statements	
No norm scores for our target group	
Testing environment often appeared cold and hostile	

# **Theoretical Basis for the EGUIDE tools**

This chapter gives a rough guide to the theoretical background to the EGUIDE tools.

It goes over the following

## **2.1 Ensuring appropriate theoretical background**

## **2.2 Person Environment Fit**

## **2.3 Theoretical underpinning of the EGUIDE interest assessment**

### **2.3.1 Full description of Holland's 6 Career Interest Types**

## **2.4 Theoretical underpinning of the EGUIDE personality assessment**

### **2.4.1 Definitions of the Five Factors of Personality used in the EGUIDE tool**

## **2.5 Theoretical underpinning of the EGUIDE ability assessments**

### **2.5.1 Definitions of the Cognitive abilities used in the EGUIDE tool**

## **2.1 Ensuring appropriate theoretical background**

In the area of Career guidance, the tools that exist can be broken into three distinct areas of categories:

- Ability / Aptitude tools
- Career interest
- Personality or behavioural

Therefore in order to have a full range of tools the EGUIDE project needed to develop at least one tool in each of the above categories.

Knowing that these three categories must be included in the EGUIDE tools, the next important thing to consider was which career guidance and occupational psychology theories were the most appropriate, the most widely accepted and shown to be the most valid from a cross-cultural perspective. On this matter a number of sources were investigated. All relevant academic journals in the fields related to occupational psychology and psychometric assessments were explored. All existing Career Guidance tools have at their foundations some psychological or occupational theory; these theories were searched for their relevance to the EGUIDE project. Career guidance practitioners in the partner countries and academic experts in the field of psychometric and organisational psychology were consulted in order to gain their opinion on the best theoretical framework to be used to underpin the EGUIDE tools. The theories that were found to be the best suited are described below under the headings, Ability/Aptitude, Career Interest, and Personality / Behavioural.

## **2.2 Person Environment Fit**

Person Environment Fit is an important concept in career guidance as it is the basis of the need for career guidance assessments. As early as 1909 the famous career psychologist Parson (1909) created the slogan that defines well the process of career guidance and person environment fit, know the person, know the environment and then through a process of logical reasoning find a match between the two.

The use of the PE fit theory is based on the assumption that people vary in their interests, values, needs and abilities just as occupations vary in their incentives, resources and demands ( French, Caplan and Van Harrison 1982). The Person Environment Fit (PE fit) model has two levels and can be seen as a kind of tug-of-war between the person and the environment. The first level is the strain between the needs and values of the person and the resources that the environment can provide, if there is a match here the person will be continually rewarded by the environment and the interaction becomes balanced, if this is not the case then the persons needs are not being met and the environment cannot provide the resources the person needs to cope therefore the person is more prone to stressful events in the environment and will be punished for it. The second level of the Person Environment Fit model is the strain between the person's abilities and the demands placed upon the person by the environment. If the person has congruent abilities to meet the demands placed on them in the environment, then the person will be able to cope with more easily with challenges and will be motivated intrinsically and extrinsically by the environment, if however this is not the case the person will not be able to cope stress in the environment and therefore become dissatisfied with the environment as the negative consequences of not being able to do the job mount.

Another aspect of the person environment fit model and an aspect in which career guidance assessments play a major part, is the difference between subjective PE fit and objective PE fit or in other words the difference between perception and reality. The person can subjectively believe that his values and interests do indeed match the environments resources, however when he or she enters the environment can realise that in reality or objectively that this is not the case. Secondly, the person can

subjectively believe that they have the abilities to meet the demands of the environment; however when they enter the environment the reality of the demands in the environment shows them that this is not the case. Career guidance assessment and career guidance counselling can close the gap between subjective environment fit and objective environment fit by giving the person a realistic view of their interests, their behaviour and their abilities.

A good PE fit has many positive consequential outcomes for the person and the environment. French et al 1982 in their comprehensive study of the consequences of PE fit found that dissatisfaction, anxiety, boredom and depression all increased when the PE fit was not balanced, all of these are indicators of stress at work. The researchers also found evidence that a misbalanced PE fit increased the amount of cigarettes smoked, the amount of cortisol in the blood and an increased heart rate, all of these factors lead to un-healthiness and shorter life expectancy. Whereas a good PE fit leads to satisfaction increased salary and promotion (Sekiguichi 2004). Getting an understanding for the person, knowing their interests, values, personality and abilities therefore helps increase the potential well-being the person will feel about their chosen occupation and will limit the stress and strain associated with that occupation.

### **2.3 Theoretical underpinning of the EGUIDE interest assessment (Interest Explorer)**

Interests are an important aspect in the selection of a career. Interests portray a person's self-concept, what they would like to do in their every day lives and how they would like others to see them in their everyday lives. Interests represent an expression of personality in work, in hobbies, in recreational activities and preferences (Holland 1973). The work of occupational psychologist John Holland (1959, 1973, and 1997) and his type model of Career Interests starting almost 50 years ago has shown that if a person is interested in the career or training course that they go into they are more likely to be motivated and become successful. Career Interest Types are used by career counsellors to make the client aware that different people have different interests and that the client would be happier and more motivated in an environment that fits their interests.

Rounds 1995 stated that Interests reflect preferences for certain behaviors and activities, the contexts in which these preferred activities occur, and also the outcomes associated with the preferred activities. Therefore if the individual gets an awareness or understanding of their own interests they will also get an understanding of the environment contexts they might be enjoy in as well as the work activities that they might take pleasure in. As such, interests emerge through the individual's experiences interacting with and adapting to the environment. Interests offer a systematic framework for describing educational, work, and leisure environments that can be used in career counseling and other applied settings. Holland's Interest Model is most often used and has gained wide acceptance because of its intuitiveness, simplicity and 40 years of evidence to support its link between the person and the environment.

Holland's (1973, 1985, 1994) theory of career personality types is based on three notions. First, people can be categorised into six career personality types corresponding to six types of occupational environments: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). Second, people purposefully look for environments that are congruent with their career personality

types. Finally, people's vocational behaviors are the result of the interaction between their career personalities and the environments in which they reside. Person environment fit is key to Holland's Career Interests model. If there is congruence between the Interests of the person and the activities in the environment the person will be internally satisfied and externally rewarded by the environment. If congruence between person and environment does not exist, the person is more likely to change settings.

In order to give the concept of Holland's model life, below is a quote showing his understanding of interests.

*“The choice of an occupation is an expressive act which reflects the person's motivation, knowledge, personality and ability. Occupations represent a way of life, an environment rather than a set of isolated work functions or skills. To work as a carpenter means not only using the tools but also to have a certain status, community role and a special pattern of living. In this sense, the choice of an occupational title represents several kinds of information: the [person's] motivation, his knowledge of the occupation in question, his insight and understanding of himself and his abilities (Holland 1965, p2)*

The realistic type of people like to work with things and enjoy out-door activities, but may lack social skills. People with the investigative type of career personality like to be engaged in investigative and scientific kinds of work, but often lack leadership ability. The artistic type of people like to deal with tasks that provide them with the opportunities for using their imagination, but often lack clerical skills. The social type of people like to work in situations in which they can interact and cooperate with other people, but may lack mechanical and scientific ability. Like the social type of people, people with an enterprising career personality also enjoy working in environments in which they can interact with people; however, the enterprising type of people like to take leaderships. Finally, the conventional type of people like to work with data under well-structured situations, but often lack artistic ability (Zhang 2004)

### 2.3.1 Full description of Holland's 6 Career Interest Types (taken from Holland 1973, p 14-18)

#### The Realistic type:

The Realistic person tends to a preference for activities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines and animals and to an aversion to educational or therapeutic activities. These behavioural tendencies lead in turn to the acquisition of manual, mechanical, agricultural, electrical and technical competencies and to a deficit in social and educational competencies....

1. He prefers realistic opportunities or situations (for example, craftsman) in which he can engage in preferred activities and avoid activities demanded by social occupations or situations
2. He uses realistic competencies to solve problems at work and in other settings
3. He perceives himself as having mechanical and athletic abilities and lacking ability in human relations
4. He values concrete things or tangible personal characteristics – money, power, status

Because the Realistic person possesses these preferences, competencies, self-perceptions, and values, the Realistic person is apt to be:

Asocial (shy)	Materialistic	Self-effacing
Conforming	Natural	Stable
Frank	Normal	Thrifty
Genuine	Persistent	Un-insightful
Masculine	Practical	Uninvolved

### **The Investigative type:**

The Investigative person tends to a preference for activities that entail the observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena in order to understand and control such phenomena; and to an aversion to persuasive, social and repetitive activities. These behavioural tendencies lead in turn to an acquisition of scientific and mathematical competencies and to: Deficit in persuasive competencies....

1. He prefers investigative occupations or situations in which he can engage in his preferred activities and competencies and avoid the activities demanded by enterprising occupations or situations
2. He uses investigative competencies to solve problems at work and in other settings
3. He perceives himself as scholarly, intellectually self confident having mathematical and scientific ability and lacking leadership ability
4. He values science

Because the Investigative person possesses these preferences, competencies, self-perceptions, and values, the Investigative person is apt to be:

Analytical	intellectual	pessimistic	unpopular
cautious	introspective	precise	
critical	introverted	rational	
curious	methodical	reserved	
independent	passive	reserved	

### **The Artistic type:**

The Artistic person tends to a preference for ambiguous, free, unsystematic activities that entail the manipulation of physical, verbal, or human materials to create art forms or products, and to an aversion to explicit, systematic, and ordered activities. These behavioural tendencies lead in turn to an acquisition of artistic competencies - language, art, music, drama, and writing - and to a deficit in clerical or business system competencies....

1. He prefers artistic occupations or situations in which he can engage in preferred activities and competencies and avoid activities demanded by conventional occupations or situations
2. He uses artistic competencies to solve problems at work and in other settings
3. He perceives himself as expressive, original, intuitive, feminine, nonconforming, independent, having artistic and musical ability
4. He values aesthetic qualities

The Artistic person is apt to be:

Complicated	Idealistic	Introspective
Disorderly	Imaginative	Intuitive
Emotional	Impractical	Non-conforming
Feminine	Impulsive	Original
Idealistic	Independent	

### **The Social type:**

The Social person tends to a preference for activities that entail the manipulation of others to inform, train, develop, cure, or enlighten; and an aversion to explicit, ordered, systematic activities involving materials, tools or machines. These behavioural tendencies lead in turn to an acquisition of human relations competencies such as interpersonal and educational competencies and to a deficit in manual and technical competencies....

1. He prefers social occupations or situations in which he can engage in his preferred activities and competencies and avoid the activities demanded by realistic occupations or situations
2. He uses social competencies to solve problems at work and in other settings
3. He perceives himself as liking to help others, understanding of others, having teaching ability
4. He values social and ethical activities and problems

The Social person is apt to be:

Ascendant	Idealistic	Tactful
Co-operative	Insightful	Understanding
Feminine	Kind	
Friendly	Persuasive	
Generous	Responsible	
Helpful	Social	

### **The Enterprising type:**

The enterprising type prefers the manipulation of others to attain organizational goals or economic gain, and has an aversion to observational, symbolic, and systematic activities. These tendencies lead to the acquisition of leadership, interpersonal, and persuasive competencies, and to a deficit in scientific competencies. The enterprising type values political and economic achievement.

1. He prefers enterprising occupations or situations in which he can engage in his preferred activities and competencies and avoid the activities demanded by investigative occupations or situations
2. He uses enterprising competencies to solve problems at work and in other settings
3. He perceives himself as aggressive, popular, self-confident, sociable, possessing leadership and speaking abilities and lacking scientific abilities
4. He values political and economic achievement

The enterprising type is apt to be:

Acquisitive	Energetic	Optimistic
Adventurous	Exhibitionistic	Self-confident
Agreeable	Excitement seeking	Sociable
Ambitious	Extroverted	Talkative
Domineering	Flirtatious	

### **The Conventional type:**

The conventional type prefers explicit, ordered, systematic manipulation of data, such as keeping records, filing materials, reproducing materials, organizing written and numerical data according to a prescribed plan, operating business machines and data processing machines to attain organizational or economic goals, and has an aversion to ambiguous, free, exploratory, or unsystematised activities. These tendencies lead to the acquisition of clerical, computational, and business system competencies and to a deficit in artistic competencies. Conventional types value business and economic achievement

1. He prefers conventional occupations or situations in which he can engage in his preferred activities and competencies and avoid the activities demanded by artistic occupations or situations
2. He uses conventional competencies to solve problems at work and in other settings
3. He perceives himself as conforming, orderly and as having clerical and numerical abilities
4. He values business and economic achievement.

The conventional type is apt to be:

Careful Inflexible	Defensive Obedient	Persistent	Thrifty
Conforming Inhibited	Efficient Orderly	Practical	Unimaginative
Conscientious Methodical	Persistent	Prudish	

## **2.4 Theoretical underpinning of the EGUIDE personality assessment (Personality Discovery Quiz)**

The fundamental reason for developing a personality assessment is to try to predict behaviour. The principal assumption of a personality assessment is that behaviour is an interaction of two factors - personality and situational influences. Therefore if personality is known to some degree and environment is anticipated to some degree then the actions of the person in one particular environment can be anticipated from examining the product of the two. The EGUIDE personality assessment is to be used to anticipate the person's interaction with the environment, and then through a discussion with the individual match which career or job environment suits the anticipated behaviours.

There are many different definitions of personality, however they all tend to concentrate on the same particular themes i.e. stable characteristics, the interaction between the person and the environment, and some element of uniqueness in that personality tends to distinguish one person from another. For example the oxford dictionary of psychology defines personality as "The sum total of the behavioural and mental characteristics that are distinctive of an individual" (Colman 2006). Ryckman, 2004, defines personality as a "dynamic and organised set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations, and behaviours in various situations". Dworetzk, 1998 defines personality as "The organisation of relatively enduring characteristics unique to an individual, as revealed by the individuals interaction with his or her environment".

In developing the EGUIDE personality assessment, much research was conducted to establish what theories of personality were most suitable and the most widely applicable. The one model of personality that appeared to fit needs of the EGUIDE project was the Five Factor Model (FFM). The FFM proposes that there are five major factors of personality and that every personality falls somewhere on the continuum of each factor. The factors are Openness, Conscientious, Extraversion, Agreeableness and Neuroticism (OCEAN). Each of these factors has a dichotomy

within it for example the Extraversion factor contains the dichotomy Outgoing/Shy, and the Conscientiousness factor contains the dichotomy Persistent / distractible.

The five factors were derived from analyses of a large number of self- and peer reports on personality-relevant adjectives and questionnaire items initially by Thurstone in 1933 and again by Norman in 1963. The theory however did not enter popularity until the research of Goldberg and Digman in 1981, they reviewed all available personality assessments and conducted their own lexical analysis, and they concluded that the personality assessments with the most potential measured five sub factors. Then in the early eighties, hundreds of research papers emerged confirming this. Costa and McCrae published the NEO PI-R in 1985.

One of the most important advances of the FFM was the creation of a common taxonomy that gives organisation to a historically scattered area. What separates the FFM of personality from all others is that it is not based on the theory of any one particular psychologist, but rather on language, the natural method that individuals use to comprehend one another.

A number of meta-analyses have confirmed the validity of the FFM across a wide range of behaviors and performance. Saulsman and Page (2004) looked at the relationships between the FFM dimensions and each of the 10 personality disorder groups in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. They found that each disorder showed a distinctive and measurable five-factor profile. The most prominent and consistent personality predictors underlying the disorders were positive relations with Neuroticism and negative relations with Agreeableness.

In the area of job performance, Barrick and Mount (1991, 1998) reviewed 117 studies utilizing 162 samples with 23,994 participants. They found that conscientiousness showed consistent relations with all performance criteria for all occupational groups. Extraversion was a valid predictor for occupations involving social interaction (e.g. management and sales). Furthermore, extraversion and openness to experience were valid predictors of training proficiency criteria.

Other evidence linking the FFM to behaviours include

- High Openness to experience has been linked to training proficiency and attention levels (Peterson & Cason 2000, Barrick & Mount, 1991)
- High Conscientiousness linked to work performance, study performance (Salgado 1997, Wolfe & Johnsson 1995)
- High Extraversion has been linked to leadership roles, Job performance in jobs where interaction is important (Salgado 1997)
- Agreeableness shown to link to training proficiency (Salgado 1997)
- High Neuroticism has been linked with low self-esteem and low ability to cope adaptively with stress (Schmitz et al, 2003)

The Benefits of the FFM are manifold, however the main points that differentiate it from other models and that make it very powerful for the EGUIDE tools are:

- Five dimensions of personality,
- A normal distribution of scores on these dimensions,
- An emphasis on individual personality traits (the type concept is gone),
- Preferences indicated by strength of score,
- A model based on experience, not theory.
- A model that is cross-culturally valid and valid in multi-lingual cultures

### **2.4.1 Definitions of the Five Factors of Personality used in the EGUIDE tool**

**Openness:** Openness describes a dimension of personality that distinguishes imaginative, creative people from down-to-earth, conventional people. Open people are intellectually curious, appreciative of art, and sensitive to beauty. They tend to be, compared to closed people, more aware of their feelings. They therefore tend to hold unconventional and individualistic beliefs. People with low scores on openness to experience tend to have narrow, common interests. They prefer the plain, straightforward, and obvious over the complex, ambiguous, and subtle. They may regard the arts and sciences with suspicion, regarding these endeavors as abstruse or of no practical use. Closed people prefer familiarity over novelty; they are conservative and resistant to change

**Conscientiousness:** concerns the way in which we control, regulate, and direct our impulses. High scorers on conscientious avoid trouble and achieve high levels of success through purposeful planning and persistence. They are also positively regarded by others as intelligent and reliable. On the negative side, they can be compulsive perfectionists and workaholics. Low scorers on conscientiousness are considered distractable and impulsive, impulses are not inherently bad; occasionally time constraints require a snap decision, and acting on our first impulse can be an effective response. Also, in times of play rather than work, acting spontaneously and impulsively can be fun. Impulsive individuals can be seen by others as colorful, fun-to-be-with, and zany, but on the negative side can be seen as unambitious, distractable time-wasters.

**Extraversion:** Concerns the motivation towards being around others, interacting with others making new friends. High scorers tend to enjoy being with people, are full of energy, and often experience positive emotions. They tend to be enthusiastic, action-oriented individuals who are likely to say, "Yes!" or "Let's go!" to opportunities for excitement. In groups they like to talk, assert themselves, and draw attention to themselves. Low scorers tend to be quiet, low-key, deliberate, and less dependent on the social world. Their lack of social involvement should not be interpreted as shyness or depression; the introvert simply needs less stimulation than an extravert and more time alone to re-charge his batteries.

**Agreeableness:** Reflects individual differences in concern with cooperation and social harmony. High scorers on Agreeableness have an optimistic view of human nature, and value getting along with others; they are therefore considerate, friendly, generous, helpful, and willing to compromise with others. Agreeable individuals are usually more popular and are good in team work situations. Low scorers on agreeableness place self-interest and independence above getting along with others. They are generally unconcerned with others' well-being, and are less likely to extend themselves for other people. Sometimes their skepticism about others' motives causes them to be suspicious, unfriendly, and uncooperative. Disagreeable individuals are good in situations that require tough or absolute objective decisions.

**Negative Emotionality (Neuroticism):** Refers to the tendency to experience negative emotions. People high in Neuroticism are emotionally reactive. They respond emotionally to events that would not affect most people, and their reactions tend to be more intense than normal. They are more likely to interpret ordinary situations as threatening, and minor frustrations as hopelessly difficult. Their negative emotional reactions tend to persist for unusually long periods of time, which means they are often in a bad mood. These problems in emotional regulation can diminish an ability to think clearly, make decisions, and cope effectively with stress. Those who score low in Neuroticism are less easily upset and are less emotionally reactive. They tend to be calm, emotionally stable, and free from persistent negative feelings. Freedom from negative feelings does not mean that low scorers experience a lot of positive feelings; frequency of positive emotions is a component of the Extraversion domain.

## **2.5 Theoretical underpinning of the EGUIDE ability assessments (Cognitive Explorer 1 - 4)**

Abilities are relatively enduring basic capacities for performing a wide range of different tasks (Fleishman 1975). Ability assessments are prospective rather than introspective in that they measure a person's potential, for instance to learn the skills needed for a new job or to cope with the demands of a training course. General cognitive ability is usually divided up into specific abilities, so a general ability assessment is composed of specific numerical, verbal and spatial ability scales brought together as a test battery.

From the investigation of the existing ability tests that are used by career guidance professionals and upon the advice of experts in the field of Cognitive Assessment the Taxonomy of Human Abilities compiled by Edwin Fleishman was chosen for EGUIDE. The Taxonomy is based on extensive experimental and factor analytic research on the nature of human abilities (Fleishman and Quaintance, 1984).

Conducted over a 50-year period, this research program consisted of a wide variety of laboratory tasks based on 580 jobs, designed to elicit performance from subjects drawing on one or more hypothesised underlying abilities. Task batteries were systematically varied to hone in on specific abilities and to delineate the boundaries of their application. Thus, the research linked task characteristics to ability requirements to produce the Fleishman Taxonomy of Human Abilities.

The Fleishman taxonomy provides detailed descriptions of 52 abilities, including cognitive (e.g., oral comprehension), physical (e.g., arm-hand steadiness), psychomotor (e.g. reaction time), and sensory-perceptual (e.g., depth perception) domains. Nine social-interactive abilities (e.g., persuasion) and 13 job skills and knowledge (e.g., mechanical knowledge) (Fleishman, 1992). Of the 52 abilities listed, 21 are specific cognitive abilities (See Appendix I). These 21 abilities cover the full spectrum of mental ability needed to perform any task in any job.

Fleishman's taxonomy of cognitive abilities has been used as the basis of many specific aptitude tests including SHL's GAP ability tests

Research in the field of Psychometric test developments suggested that the minimum number of test items needed per scale for statistical reliability is eight (Pervin 2001). Therefore, in order to assess all 21 of Fleishman’s defined abilities 168 items were needed to be developed. On consulting with practitioners this was seen as too long for a cognitive test for the target group and that a test with 60-80 items would be more preferable. Therefore the number of abilities to be measured had to be pruned in some way.

After a number of project meetings about the Cognitive tests that would be used in the EGUIDE test Battery it was decided that 15 out of the 21 abilities could be measured using the online format developed for the EGUIDE project in a standardised fashion (See Table 2.1 for excluded abilities). On this basis the project would have to produce a cognitive test with 120 items and 15 example items. Thus the project would have to find some other way of reducing the number of abilities to be measured in the cognitive test.

**Table 2.1: Fleishman’s ability categories by grouped by sub-headings**

	<b>Verbal abilities</b>	<b>Idea generation and reasoning abilities</b>	<b>Quantitative abilities</b>	<b>Memory</b>	<b>Perceptual abilities</b>	<b>Spatial abilities</b>	<b>Attention</b>
1	Oral comp	<del>Fluency of Ideas</del>	Mathematical reasoning	Memorisation	Speed of closure	Spatial Org	<del>Selective attention</del>
2	Written comp	<del>Originality</del>	Number Facility		Perceptual speed	Visualisation	<del>Time Sharing</del>
3	<del>Written express</del>	Problem Sensitivity					
4	<del>Oral Express</del>	Deductive					
5		Inductive					
6		Information ordering					
		Category flexibility					

\* ~~Category~~ = Cannot be measured by standardised online test

A number of methods of item reduction were considered but the best approach that was advised by experts in the field was to map the abilities from Fleishman’s Taxonomy to a model of general intelligence. The most widely accepted and

theoretically valid model of intelligence, the Cattell Horn Carroll Theory (CHC theory) (1993, 2003) was chosen for this purpose.

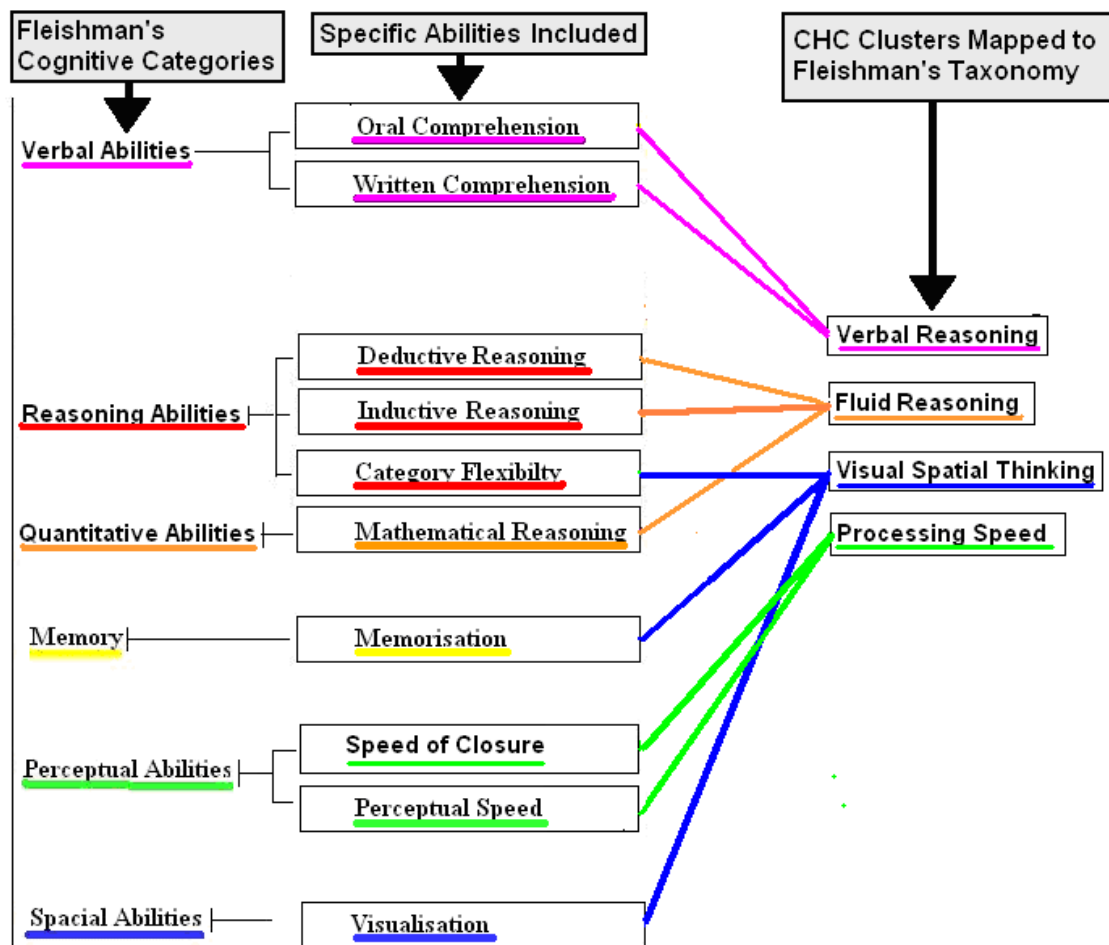
The Cattell–Horn–Carroll (CHC) model describes a hierarchical model of cognitive abilities that vary according to level of generality: narrow abilities, broad abilities, and general intelligence (*g*). Narrow abilities include approximately 70 abilities that are generally marked by specific types of tasks and standard response processes. Broad abilities include Fluid Reasoning, Comprehensive Knowledge, Long term retrieval, Short-term Memory, Visual Spatial Thinking, Auditory Processing, Phonemic awareness and Processing Speed. At the apex of this hierarchical model is *g*. Many recognise the sources of this model, the Cattell–Horn *Gf-Gc* theory (Horn & Noll, 1997) and the Carroll three-stratum theory (Carroll, 1993, 2003), as the most complete and empirically supported descriptions of the structure of human cognitive abilities.

While we could not say that the categories within the Fleishman Taxonomy constituted a measure of general intelligence, the Fleishman’s taxonomy of human abilities could be linked to the CHC model through the definitions and the structure of broad ability clusters within the CHC model. As mentioned above the CHC model has 8 Broad cognitive ability clusters, when these 8 clusters were examined closely by looking at the contents of their definitions and looking at the tests that are included in the Woodcock Johnson III (the intelligence test that is based on the CHC model) it emerged that 3 of these clusters can be reconciled to the abilities contained in the Fleishman Taxonomy (see figure 1). These three clusters are Fluid Reasoning, Visual Spatial Thinking, and Processing Speed. These clusters allow us to group the Fleishman abilities into three larger sub tests for the EGUIDE cognitive test Battery. These three clusters of abilities allowed us to reduce the number of specific abilities from the Fleishman Taxonomy by 5 abilities, Problem sensitivity, Number Facility, Information Ordering, Flexibility of Closure and Spatial Orientation.

There were however two abilities that did not fit into the broad CHC clusters that were seen as very important categories these were the important abilities of Written and Oral Comprehension. These two abilities from the Fleishman Taxonomy however did fit into the wider cognitive performance model cluster called “Verbal

Ability” within the CHC model. Thus much of what the EGUIDE project could assess via the Fleishman taxonomy in 120 items could be explained with 4 clusters within the CHC model that would amount to 80 items. Definitions of the four clusters are given below figure 1.

**Figure 2.1: Model Mapping the reconciliation between the Fleishman Taxonomy and the CHC Theory**



## **Definitions of the Cognitive abilities used in the EGUIDE tool**

### **Verbal Reasoning**

This is a grouping of abilities defined by the Cattell Horn Carroll (CHC) theory as “Higher order language-based acquired knowledge and the ability to communicate that knowledge”

This cluster will include the following specific abilities from the Fleishman taxonomy

1. **Oral Comprehension** is the ability to understand spoken English words and sentences.
2. **Written Comprehension** is the ability to understand written sentences and paragraphs

### **Fluid Reasoning**

This is a cluster of abilities defined by the CHC theory as “ The ability to reason, form concepts, and to solve problems using unfamiliar information or novel procedures”

This Grouping will include the following specific abilities from the Fleishman taxonomy

1. **Inductive Reasoning** is the ability to combine separate pieces of information or specific answers to non-mathematical problems or to form general rules or conclusions.
2. **Deductive Reasoning** is the ability to apply general rules to specific problems and to come up with logical answers; for example, deciding whether or not an answer to a non-mathematical problem makes sense or solving syllogistic reasoning problems.
3. **Mathematical Reasoning** is the ability to understand and organise a problem and then to select a mathematical method or formula to solve the problem.

## **Visual Spatial Thinking**

This is a grouping of abilities defined by the CHC theory as “The ability to perceive, analyse, synthesise and think with visual patterns including the ability to store and recall visual representations

This Grouping will include the following specific abilities from the Fleishman taxonomy

1. **Category Flexibility** is the ability to produce many rules so that each rule tells how to group or combine a set of things in a different way
2. **Memorisation** is the ability to remember information, such as words, numbers, pictures and procedures.
3. **Visualisation** The ability to imagine how something will look after it has been moved around or its parts have been moved or changed

## **Processing Speed**

This is a grouping of abilities defined by the CHC theory as “ the ability to perform automatic cognitive tasks, an aspect of cognitive efficiency”

This Grouping will include the following specific abilities from the Fleishman taxonomy

1. **Speed of Closure** is the ability to quickly make sense of information that seems to be without meaning or organisation. It involves quickly combining or organising different pieces of information into a meaningful pattern
2. **Perceptual Speed** is the ability to compare letters, numbers, objects, pictures or patterns quickly and accurately.

# Methodology for creating the EGUIDE Tools

What follows is a brief description of the methodology used to create the content for the EGUIDE tools. For each of the assessment categories defined in the previous section a similar methodology was used in order to get a user-friendly and valid set of items (statements or questions).

## ***3.1 Types of test construction used***

The tools were constructed by combining three key methods: rational, theoretical and statistical test construction.

Rational test construction means that questions are selected based on the content within the question. This is where the traits that the tool will measure are known.

Theoretical test construction is where items are created following a theoretical model, such as the five-factor model of personality.

Statistical test construction this is where the number of items in the questionnaires are reduced and grouped according to statistical methods.

## ***3.2 Target group***

The first and most important consideration for the EGUIDE project was the target group to be measured. The crucial aim of the tools was to fill the gaps associated with these types of tools for a disadvantaged population. Therefore the methods of tool construction were tried to be very sensitive to the user and took a bottom up approach to tool construction.

### **3.3 Methodological Steps**

1. For each assessment category an initial library of 3 times the number of items needed for the final assessment were created. Practitioners who work in the field of occupational guidance for disadvantaged job seekers created the items. The practitioners were directed by occupational psychologists on the theory of each of the categories. The practitioners have an understanding of the client target group and therefore it was seen as fundamental that they be involved in creating items that would be understood by their clients. Clients themselves had a say in creating the library of items, in that focus group methodology was used to brainstorm clients. The focus groups were asked for scenarios they would be familiar with in reference to adjectives described by Holland's Interest Types and the five-factor model of personality. Focus groups were also asked for scenarios in which they might do different types of tasks from the Fleishman's taxonomy in every day life.

When the library for each assessment category was complete there was 212 items for the interest assessment, 180 items for the personality assessment and 160 items for the ability assessment.

2. The next step in the methodology was to ensure that the items were valid across the cultures involved in the EGUIDE tool development. The partner countries that were involved in the development of the tools and that the tool needed to be valid for were, Ireland, Northern Ireland, Germany, Spain, Italy and Hungary. The items and scenarios were presented at a three-day meeting to teams from these countries in order to extract any items that would not work for the cultures. For example one of the scenarios was of someone skiing down a hill and the script said "I am a confident person", in Ireland this works because skiing is not an everyday occurrence, however in Germany where skiing is normal, you do not have to be a confident person to do this. By the end of the three days the project was left with a library of items that would work cross-culturally.

3. The next step was to ensure that items left in the library of items were understandable to the users of the assessments namely the disadvantaged job seekers. A pilot test was conducted on 20 clients from southern Ireland and 20 clients from Northern Ireland. From this pilot any item that a client was having difficulty understanding was noted down. At the end of the pilot any item that had a note was either discarded or changed to make it easier to comprehend.
4. The next step was to develop visual, sound and Internet aspect of the assessments. All the tools are animated using flash animation; all of the scripts are recorded in mp3 format. An Internet framework was produced to allow all of the assessments to sit online. The final step in the initial creation was to translate all of the scripts voiceovers and animations into German and Spanish.
5. Our very talented Romanian partners who programmed using action scripts to collect the data put all of the tools online. Our Romanian partners also developed a very clever online system that allows hierarchical access to the system. Clients can access the tools through usernames and passwords set up by the practitioners. The client does not have to do all of the assessments at once, they can come out of the system and log back in and the system remembers where they left off. Practitioners have separate accounts so that they can access the backend of the tests. Here the practitioner sets up a username and password for the client, selects which of the tools he wants the client to do, as soon as the client has finished the tools the practitioner is able to print a user profile for the client. The practitioner can then see the other raw scores from the assessments and compare these to the norm or standardised scores for the target population. The data from the tools is stored in secure SQL servers.
6. The final step in the methodology was to do a full pilot of the animated tools. In total four hundred individuals did the assessments. Two hundred and fifty did the tools in Southern Ireland, fifty in Northern Ireland, fifty in Spain and

fifty in Germany. From this pilot norm groups were created to allow practitioners in the field of occupational guidance to give feedback based on standardised data for the specific target group of disadvantaged job seekers.

### ***3.4 Motivational design features***

All of the design elements of the tool had the aim of maximising user-friendliness for the client and minimise test anxiety. The tools were designed to be welcoming and friendly in order for the client to be more at their ease than they would be in a traditional testing environment. A number of features of the tool try to maximise client motivation by keeping interest aroused. These features include:

- Brightly coloured animations that interact with the clients,
- Some humorous animations allowing the client to smile therefore relieving tension and anxiety associated with tests.
- Animated computer game introductions setting giving the instructions and gaining a report with the client
- Voiceovers during the tools are modulated in accent, tone and volume
- The problem solving tools zone into areas of experience of the client allowing an appreciation of the relevance of the tools
- The personality and interest scenarios show the client familiar settings at the right level
- The response options in the interest and personality tools show smiley faces as well as the text responses.
- Simple language

# EGUIDE user profile and scoring

## ***4.1 The EGUIDE Online framework***

The EGUIDE online framework is the system in which the EGUIDE psychometric assessments sit. The online framework is a flexible assessment environment that allows different levels of access to clients and practitioners. The two main levels of access to the online framework are client accounts and instructor accounts.

The client accounts allow the client access to the tools for a once off session. The tools that the client has access to depend on which tool(s) the instructor has chosen for them to do. The client must log in and off the system. The client receives a username and password from his or her instructor. The client does not have to do all the tools set for him or her in the one setting, the client can log off the system and can come back at some other time and the system will remember their finishing point.

The practitioner account allows the practitioner to set-up client accounts, view result profiles for the clients and drill down further into the exact answer pattern of the client. The practitioner has the power to decide which of the tools they think would be appropriate or suit the client; therefore the practitioner does not have to set all of the tools in the battery for the client. As soon as the client has finished the assessments set for them, the practitioner has access to the profile report. The profile report is a quick and easy way of getting all of the aggregate scores for the client for the three tool categories at once. It is one printout sheet that allows the practitioner to scan quickly the results to give a good overview of the client's interests, personality and abilities. If the practitioner wants to drill down further into each of the assessments, there is a separate profile report for each of tools, which gives the exact answer pattern and sub factor scores.

## **4.2 Results Profiles**

The result profiles are designed to show how the client scored on each of the sub-factors of the EGUIDE tools. Bar charts show each of the sub factor headings (see chapter 3 “Interpretation and Norm Scores”). Scales are designed to determine a low, and high score for the different sub factors. All of the sub-factors are assumed to have approximate normal distribution. Standardised scores are constructed based on normal distribution characteristics, which are: Most clients come in around the middle of each sub-factor, few come in at the extreme end of each factor, and the distribution of the population is symmetrical and bell shaped.

### **4.2.1 Understanding the Full-Profile Raw scores**

In order to understand the Full-profile report you must first understand how the visible “Raw-Scores” in the “Full Profile” report are calculated. The figures are called “Raw-Scores” because they are not standardised and therefore cannot be interpreted relative to the target group. Looking at Figure 4.1, you can see an example of a “Full-Profile”. The report consists of all of the sub-factor headings to the right of each heading there is a coloured bar indicating the total raw score. Below there is a short description of how the scores are calculated for each test category

**Figure 4.1: Example Full-report profile**

Label	Points	Time
Artistic = mary + fiona	45	
Social = david + mark	45	
Conventional = jennifer + steven	35	
Enterprising = sara + michael	35	
Investigative = john + brendan	33	
Realistic = connor + sandra	23	

Personality pilot test

Label	Points	Time
Emotional Instability = steven - david	15	
Openness = fiona - michael	13	
Extraversion = mark - sandra	4	
Agreeableness = mary - sara	4	
Conscientiousness = paul - jennifer	-3	

Ability chart













Label	Points	Time
Speed of closure	8	00:10:20.2
Perceptual speed	6	00:11:40.5
Memorisation	6	00:21:08.3
Flexibility	4	00:04:04.7
Visualisation	1	00:09:42.7
Written comprehension	7	00:20:53.8
Oral ability	4	00:05:55.5
Deductive reasoning	6	00:28:59.7
Mathematical reasoning	2	00:10:00.7
Inductive reasoning	1	00:39:16.7

#### 4.2.1a Raw score calculation of Interest Explorer

In the Interest Explorer there are 12 animated characters, 1 character for each of the 6 interest types portrays every day interests and 1 character for each of the 6 interest types portrays job interests. Each character is shown doing 6 activities. Therefore there are 72 activities shown 12 for each interest type. When the client is presented with each activity he or she has to choose between five response options, whether he or she “Strongly Agrees”, “Agrees”, “Unsure”, “Disagrees” or “Strongly Disagrees” with each statement. If the client chooses “Strongly Agrees”, then 5 points is added to their total character profile, if the client chooses “Agree”, then 4 points is added to their total character score, if they choose “Unsure” then 3 points is added to their score, if they choose “Disagree” then 2 points is added to their score and if they choose “Strongly Disagrees” then 1 point is added to their score. Therefore the total maximum score a client can get for each character is 30 and total minimum score is 6. The scores from the two characters representing each interest score are added together to get the total score. The total maximum score a client can get for each interest type is 60 and the total minimum score a client can get for each interest type is 12. Figure 4.2 below shows the names and faces of each character according to Interest Type and whether he or she is a Job Interest Character or an Every Day Interest character. So for example if Client A score 24 in Response to Sandra and 20 in response to Connor then the total Raw score for the Realistic interest type would be 44.

**Figure 4.2: Characterisation of the Interest Explorer**

### Characterisation of the 6 career interest types











Every day Interests	Job Interests
 Sandra - Realistic	 Conor - Realistic
 Brendan - Investigative	 John - Investigative
 Fiona - Artistic	 Mary - Artistic
 Mark - Social	 David - Social
 Michael - Enterprising	 Sarah - Enterprising
 Stephen - Conventional	 Jennifer - Conventional

#### 4.2.1b Raw score calculation of Personality

In the Personality Discovery Quiz there are 10 animated characters. For each of the five factors of personality there are two animated characters, each representing the extreme high or low side of the trait. So for example within the factor Extraversion there are two animated characters one representing an Introverted, quiet and shy person and an Extraverted character showing to be extroverted, full of energy and boisterous. Each character is shown in six scenarios, therefore there are 60 scenarios in total. When the client is presented with each scenario he or she has to choose between five response options, “Very Unlike me”, “unlike me”, “Unsure”, “Unlike me” and “Very Unlike me”. If the client chooses “Very Like me”, then 5 points is added to their total character score, if the client chooses “Like me”, then 4 points is added to their total character score, if they choose “Unsure” then 3 points is added to their score, if they choose “Unlike me” then 2 points is added to their score and if they choose “Very Unlike me” then 1 point is added to their score. The maximum score the client can get for each character is 30 points and the minimum score the client can get for each character is 6 points. The raw score for each of the five factor are calculated by subtracting the points for the low character from the high character. Figure 4.3 below shows the names and faces of each character according to personality trait and whether he or she is a high score character or a low score character. So for example if client A scores 10 points for Fiona and 24 points for Michael then their total “Raw score” for the Openness trait is minus 14 points.

**Figure 4.3: Characterisation of the Five Factors of Personality**

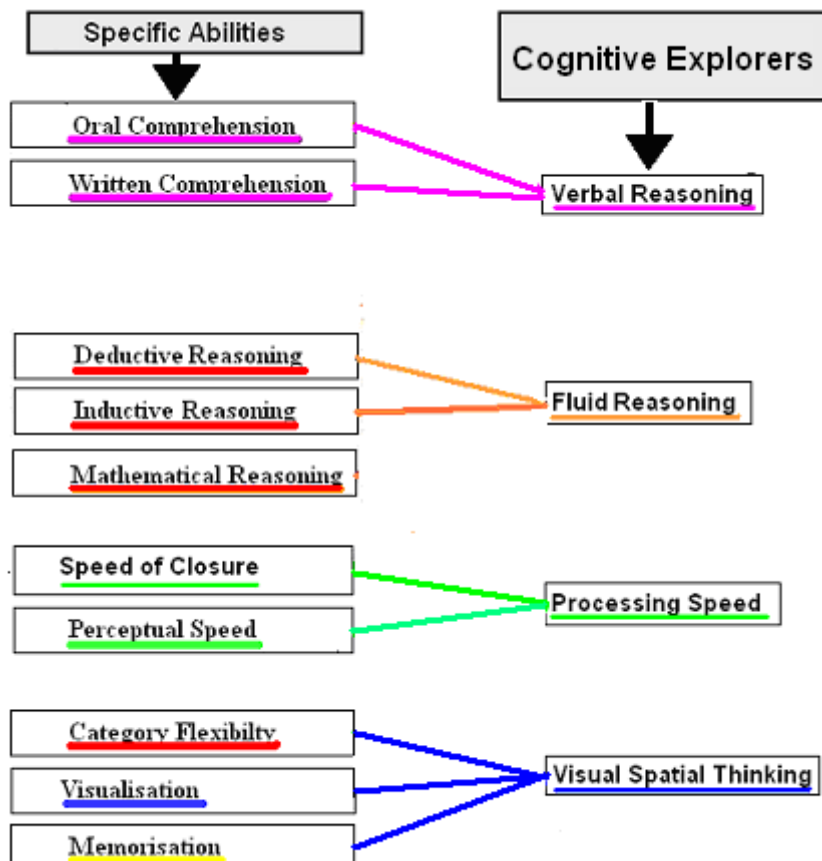
### Characterisation of the five factors of personality

	High scores		Low Scores
▪ Openness	 Fiona - Liberal	&	 Conservative
▪ Conscientious	 Paul - Persistent	&	 Distractible
▪ Extraversion	 Mark - Outgoing	&	 Quiet
▪ Agreeableness	 Mary - Team player	&	 Independent
▪ Neuroticism	 Stephen - Stress Intollerent	&	 Stress Tollerent

### 4.2.1c Raw Score Calculations of Cognitive Explorer

There are four cognitive explorer assessments, within each there are different sub sections measuring different abilities. In Cognitive Explorer 1 (Verbal Reasoning) there are 2 sub-sections, within Cognitive Explorer 2 (Fluid Reasoning) there are 3 sub-sections, within Cognitive Explorer 3 (perceptual Speed) there are two sub sections and within cognitive 4 (Visual Spatial Reasoning) there are three sub sections. In each of the sub sections there are 8 questions, the client gets one point added to their profile score for that sub section if he or she gets the correct answer for a question. The Total maximum score a client can get for each sub section is 8 points and the total minimum score a client can get for each sub-section is zero. For Cognitive Explorer 1 the total maximum is 16 points for Cognitive Explorer 2 the total maximum is score is 24 points for cognitive Explorer 3 the total maximum score is 16 points and for cognitive Explorer 4 the total maximum score is 24 points. Figure 4.4 shows the sub sections within each Cognitive Explorer. So for example is a person scored 5 points on “Oral Comprehension” and 7 points on “Written Comprehension” their total score for Cognitive Explorer 1 (Verbal Reasoning) would be 12 points.

**Figure 4.4: Division of abilities into groups**



# **EGUIDE Reliability and Standardised Scores**

The following chapter specifies the reliability of each of the test categories broken down by country and standardised scores or norm scores as found by our pilot of 297 clients from Ireland Spain and Germany. The reliability analysis and norms are summarised in tables. Also within this chapter are an examination of the interrelationships between the sub factors from the different assessments and the examination of the interrelationships within the assessments.

## ***5.1 Sample Demographics***

In total 297 clients eGUIDE over the course of the pilot. From the data recorded on the clients, approximately 65% of the sample was female and 35% male. The average age of the sample was 36 years of age and the average age they left school was 16.1 years of age. The majority of the sample described their present situation as “On a training Course” (43.8%) while 22. % said that they were currently unemployed. The 11.5% described their education level as “no formal qualification”, 30% said that they had a “junior Cert” or equivalent and 41% said that they had a leaving certificate or further educational qualification.

## ***5.2 Reliability Analysis of the Test Categories***

Reliability refers to the consistency of a measure. A test is considered reliable if we get the same result repeatedly. For example, if a test is designed to measure a trait (such as extraversion), then each time the test is administered to a subject, the results should be approximately the same. Unfortunately, it is impossible to calculate reliability exactly, but one way to estimate it is by examining the consistency of responses to similar items measuring the same trait. This is called internal consistency and is measured by calculating Crombach’s Alpha. This reliability coefficient describes how consistently respondents answered the questions. A figure of .700 or above indicates a very reliable scale.

### 5.2.1 Interest Explorer Reliability Analysis

Table 5.1 below shows the reliability coefficients for the EGUIDE Interest Explorer. There are reliability scores for each of the 6 interest types with in the Interest Explorer.

**Table 5.1: Reliability Data EGUIDE Interest Explorer For total Pilot and for separate countries**

	<b>Realistic</b>	<b>Investigative</b>	<b>Artistic</b>	<b>Social</b>	<b>Enterprising</b>	<b>Conventional</b>
<b>NI (N=18)</b>	0.8	0.429	0.709	0.814	0.849	0.083
DE(N=34)	0.91	0.759	0.888	0.916	0.91	0.831
<b>ESP(N=64)</b>	0.842	0.7	0.841	0.89	0.78	0.655
<b>IRE(N=182)</b>	0.855	0.699	0.837	0.832	0.765	0.578
<b>All (N=298)</b>	0.859	0.687	0.834	0.875	0.803	0.634

In general for the interest Explorer the reliability values were very good. The highest values are for the Social, Enterprising, and Artistic and Realistic types and slightly lower values on the Conventional and Investigative types. The values for reliability within each country also appear to be very good with the highest reliability score being for responses to the German version of the “Social” type ( $r = 0.916$ ). One scale for one country appears to stand out as having the worst reliability that is the Conventional scale for Northern Ireland ( $\alpha = .083$ ). This means for these interest type participants from Northern Ireland did not interpret the conventional activities depicted by the animations in a consistent manner. One reason hypothesised is that because one of the scenarios relating to the “Conventional” type relates to the army and uses the script “ I would like a job where I was told what I had to do”, it was interpreted differently because of the recent experience of war.

For this target group the Interest Explorer appears to be a reliable assessment. These figures give an indication that there is little need for development of this assessment in order to make it better as all participants appear to have been consistent in their

answers. This shows that the interest types as constructs hold together well and that the target group interpreted the intention of the statements and the animations consistently.

### **5.2.2 Personality Discovery Quiz Reliability Analysis**

For the personality discovery quiz 288 clients did the assessment over the piloting period of the eGUIDE. Table 5.2 shows the values Cronbach's Alpha for the Personality discovery Quiz. The values of Cronbach's alpha are good to medium. In the last row of the table for all respondents it can be seen that for two of the factors, "Conscientiousness" and "Negative emotions" are above the .700 mark. This shows that for these two factors the reliability is very good and that no re-development is needed to improve the consistency of the factors. For the "Extraversion" factor, the total reliability value is just below the .700 threshold. This implies that the factor might need minimal re development in order to make it more consistent for this client group. Finally the Openness and the Agreeableness scale have alpha reliability coefficient scores of .434 and .358 respectively, this implies that in these factors the consistency is medium and that redevelopment work should be done on the factors in order to improve this consistency possibly by changing or discarding one or two questions from each of the factors. One figure that jumps out is the reliability coefficient for Agreeableness from the German sample. This value is slightly below zero indicating that there was absolutely no consistency in the way the German sample answered the questions relating to Agreeableness. However despite this overall the figures are very good for the first development of a new personality tool and show that with a little development the tool can be made into a very good psychological assessment.

**Table 5.2: Reliability Data EGUIDE Personality Discovery Quiz For total Pilot and for separate countries**

	Openness	Conscientiousness	Extraversion	Agreeableness	Negative Emotions
<b>NI (17)</b>	0.54	0.682	0.592	0.541	0.765
<b>DE (33)</b>	0.127	0.298	0.487	-0.007	0.592
<b>ESP (65)</b>	0.495	0.8	0.656	0.459	0.636
<b>IRE (173)</b>	0.453	0.692	0.684	0.383	0.776
<b>All (288)</b>	0.434	0.702	0.648	0.358	0.733

### 5.2.3 Cognitive explorer Reliability analysis

For the 4 sub sections of the Cognitive Explorer, unfortunately because of the length of concentration needed to do all of the assessments at the same time not all clients in the pilot study managed to complete all of the assessments. Table 5.3 below shows the actual numbers of people that completed each of the sub sections of the Cognitive explorer. Most of the client who sat the personality and interest assessment also sat the Verbal reasoning, this is because this assessment was labelled Cognitive Explorer 1 and most clients chose to do this assessment first.

**Table 5.3: Total Numbers of individuals who sat the EGUIDE Cognitive explorers per country and in Total**

	Verbal Reasoning	Fluid	Perceptual	Spatial-Visual
<b>Germany</b>	34	33	34	33
<b>IRE</b>	179	162	167	149
<b>NI</b>	15	9	10	10
<b>Spain</b>	71	59	65	62
<b>Total</b>	<b>299</b>	<b>266</b>	<b>276</b>	<b>254</b>

Despite this difference in numbers who sat the assessments, the reliability figures for the Cognitive Explorer are quite strong. Table 5.4 shows the reliability coefficients for the sub-sections of the Cognitive Explorers. Reliability analysis is a little different for the cognitive assessments because instead of the client giving their opinion based on a graduated scale the client is answering a question that is either right or wrong. Therefore for the cognitive assessment, the reliability tells us the extent to which individuals answered consistently right or consistently wrong. If reliability is above .700 then there is a consistency in the answers and if it is less than that the pattern is not clear enough to suggest one construct is being tested. Three of the four sub sections show a reliability coefficient of greater than 0.700. This implies that these sub sections are quite reliable and this shows us that little further development is need in order to make them more consistent.

**Table 5.4: Reliability figures for the four sub tests of the Cognitive Explorer per country and in Total**

	<b>Verbal reason</b>	<b>Fluid reason</b>	<b>Perceptual</b>	<b>Spatial-Visual</b>
<b>Belfast</b>	0.607	0.872	0.602	0.755
<b>Germany</b>	0.827	0.883	0.861	0.536
<b>Spain</b>	0.763	0.823	0.831	0.637
<b>Dublin</b>	0.455	0.841	0.583	0.637
<b>All</b>	<b>0.575</b>	<b>0.846</b>	<b>0.723</b>	<b>0.782</b>

Verbal reasoning is the only assessment that falls below the 0.700 mark. This suggests that the questions in Verbal Reasoning are not all measuring the same thing and that further development should be undertaken to increase the reliability of this construct.

### **5.3 Creating Norms for the EGUIDE Tools**

A norm is an average or normal score for a specific target group. Norms are very important for psychometric assessments as they enable interpretation relative to the target population, in this case for disadvantaged job seekers. Norm scores allow you to say where each individual is placed in relation to a population of similar individuals. A simple example of a norm score is where a client gets 35 out of 100 on a reasoning assessment, from this “Raw Score” result it appears that the client has not done so well on the assessment, however if you are then told that the normal score for the client’s target group is 25 out of 100 it shows that the client has done very well.

For most Psychometric assessments Norm scores are only given for more advantaged sectors of the population for example business managers and graduates, EGUIDE is different because the Norm scores are only available for disadvantaged job seekers. This section will display first the Norm scores for each tool category of the EGUIDE and then go through the conversion of “Raw Scores” into Norm Scores.

### 5.3.1 Interest Explorer Norm Scores

Normal score tables have been developed by analysing the raw scores of the Interest Explorer. Table 5.5 below shows the average raw score on each of the 6 types. The average raw scores for all of the 298 participants show that on average the sample liked the social activities more than any other of the activities. This trend seems to be similar in the countries separately, that is except from Spain where the largest average score is for conventional interests. This means that in general an individual would have to display quite a high score on Social interests in order to be above average compared to the population of disadvantaged job seekers. Social Interests involve jobs that involve caring for others working with people to help them and solve their problems.

**Table 5.5: Average Raw scores for the Interest Explorer 6 types**

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
NI	28.78	33.61	33.39	47.22	39.94	40.17
DE	34.62	34.53	36.24	41.44	38.88	39.09
ESP	33.98	36.43	34.40	39.73	39.84	39.91
IRE	31.10	33.47	35.27	45.85	39.31	39.98
ALL	31.98	34.23	35.08	44.11	39.41	39.88

Normal scores for the pilot group were lowest for Realistic interests. This was true for all of the countries apart from Germany where investigative interests were on average the lowest. Realistic interests would lead to jobs working outdoors on practical labour intensive work. Investigative Interests appear to be the second lowest interests in the sample apart from as already mentioned Germany and Spain where they rank above Artistic and Realistic interests.

### 5.3.2 Personality discovery quiz Norm Scores

Table 5.6 below shows the average scores for the pilot for the five factors of the Big Five. As mentioned in section 4.2.1b personality raw-scores are calculated by subtracting the low scores from the high scores on each factor so that the range of raw scores is between minus 24 and plus 24. Across the entire pilot extraversion was the biggest high score; this means that on average there are more extroverts in the sample than there are introverts. Conscientiousness is the second biggest high score, which means that on average the disadvantaged job seekers that took part in the pilot are more conscientious than impulsive. Openness appears to be more towards the middle of the range of scores, meaning that on average there is a symmetry in the numbers of people that are open and like change as there are people who are closed and dislike change. The same can be said for the Agreeable trait, in that there is symmetry in the sample regarding agreeable people who are dependent on others when making decisions as there are disagreeable who like to make decisions independently. The trait Negative Emotions has on average the lowest score, although it is still near the centre of the range, this means that on average the sample is prone to less negative emotions, and less reactive to stressful situations in general.

**Table 5.6: Total Average raw personality scores for the “Big Five”**

	Openness	Conscientiousness	Extraversion	Agreeableness	Negative Emotions
<b>NI (17)</b>	3.35	5.70	7.17	3.05	-2.17
<b>DE (32)</b>	3.66	3.00	4.96	.54	-2.75
<b>ESP (66)</b>	3.58	6.06	5.60	2.15	-2.70
<b>IRE (173)</b>	3.23	5.31	5.38	2.01	-2.86
<b>All (288)</b>	3.36	5.23	5.48	1.94	-2.77

### 5.3.3 Cognitive Explorer Norm Scores

Table 5.7 shows the average scores for the pilot group on the four cognitive explorers. As mentioned in section 4.2.1c the maximum scores for cognitive Verbal Reasoning, Fluid Reasoning, Perceptual Speed and Visual Spatial are 16, 24, 16 and 24 respectively. Looking at the “All” row in Table 5.7 it can be seen that on average the highest number of questions correct was for the perceptual speed questions as the average score was 13.01 out of 16. The lowest average score over the four Cognitive Explorer sections was for Visual Spatial Reasoning, 12.31 out of 24. The same pattern appears to be the case for each of the country samples also. Although it appears that for the German sample Verbal Reasoning was a higher average. This could mean that on average this population have a good ability in verbal reasoning and Perceptual speed. Visual spatial and Fluid reasoning have the lower averages for the sample. This could be for a number of reasons, including perhaps the sample’s abilities in these areas are lower on average, perhaps the assessments for these tests are at a higher level and perhaps because these two sections of the Cognitive Explorer contain more question, more concentration is needed than the other two sections.

**Table 5.7 Average Raw scores for the four sub tests of the Cognitive Explorer per country and in Total**

	<b>Verbal Reasoning</b>	<b>Fluid Reasoning</b>	<b>Perceptual Speed</b>	<b>Visual Spatial</b>
<b>Belfast</b>	12.87	17.44	14	12.3
<b>Germany</b>	12.59	13.97	11.59	11.52
<b>Spain</b>	12.01	16.66	12.92	11.58
<b>Dublin</b>	12.51	14.17	13.28	12.78
<b>All</b>	<b>12.42</b>	<b>14.84</b>	<b>13.01</b>	<b>12.31</b>

## **5.4 Interpreting Norm Scores**

This next section displays the norm tables for each of the assessment types. These are to be used to convert the clients Raw Scores into Percentile Scores. Percentiles are not percentages, but are a way of ranking all possible raw scores on the assessment into a relative position. Therefore if a person gets a raw score that fits into the 40 to 60 percentile, this indicates their raw score is higher than 40 to 60 % of people in their norm group. If their raw score fits into the 80 to 100 percentile, this means that their raw score is higher than 80 to 100 % of people in their norm group.

The Norm scores for the Interest Explorer were calculated by analysing the average score for each interest type, calculating the standard deviation and coming up with percentile scores based on the Z-Score distribution.

This table makes it easy for the practitioner to insert their client's raw scores in order to find out the standardised score for the disadvantaged job seeker population.

0 - 20%	20% - 40%	40% - 60%	60% - 80%	80%-100%	<===== Percentiles
(12 to 23)	(23 to 28)	(29 to 32)	(33 to 37)	(38 to 60)	<b>Realistic</b>
					<i>The Realistic person tends to a preference for activities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines and ...</i>
(12 to 26)	(27 to 31)	(32 to 35)	(36 to 40)	(41 to 60)	<b>Investigative</b>
					<i>The Investigative person tends to a preference for activities that entail the observational, symbolic, systematic, and creative investigation of physical...</i>
(12 to 28)	(29 to 33)	(34 to 37)	(38 to 42)	(43 to 60)	<b>Artistic</b>
					<i>The Artistic person tends to a preference for ambiguous, free, unsystematic activities that entail the manipulation of physical, verbal,</i>
(12 to 40)	(31 to 44)	(45 to 47)	(48 to 51)	(52 to 60)	<b>Social</b>
					<i>The Social person tends to a preference for activities that entail the manipulation of others to inform, train, develop, cure, or enlighten...</i>
(12 to 33)	(34 to 37)	(38 to 40)	(41 to 44)	(45 to 60)	<b>Enterprising</b>
					<i>The enterprising type prefers the manipulation of others to attain organizational goals or economic gain, and has an aversion to observational...</i>
(12 to 35)	(36 to 38)	(39 to 41)	(42 to 44)	(45 to 60)	<b>Conventional</b>
					<i>The conventional type prefers explicit, ordered, systematic manipulation of data, such as keeping records, filing materials, reproducing materials, organizing written ...</i>

**Table 5.8: Norm Table developed for the Interest Explorer (for a more detailed norm score table see appendix?)**

Percentiles =====>	0 - 10%	10% - 30%	30% - 70%	70% - 90%	90%-100%	<===== Percentiles
<b>Openness</b>	(-24 to -4)	(-3 to 0)	(1 to 5)	(6 to 8)	(9 to 24)	<b>Openness</b>
<i>People with low scores on openness to experience tend to have narrow, common interests. They prefer the plain...</i>						<i>High scorers are open people are intellectually curious, appreciative of art, and sensitive to beauty...</i>
<b>Conscientiousness</b>	(-24 to -3)	(-2 to 2)	(3 to 7)	(8 to 11)	(12 to 24)	<b>Conscientiousness</b>
<i>Low scorers on conscientiousness are considered distractible and impulsive, impulses are not inherently bad...</i>						<i>High scorers on conscientious avoid trouble and achieve high levels of success through purposeful planning...</i>
<b>Extravert</b>	(-24 to -4)	(-3 to 1)	(2 to 7)	(8 to 11)	(12 to 24)	<b>Extravert</b>
<i>Low scorers tend to be quiet, low-key, deliberate, and less dependent on the social world...</i>						<i>High scorers tend to enjoy being with people, are full of energy, and often experience positive emotions...</i>
<b>Agreeableness</b>	(-24 to -5)	(-4 to -1)	(0 to 3)	(4 to 6)	(7 to 24)	<b>Agreeable</b>
<i>Low scorers on agreeableness place self-interest and independence above getting along with others. They are generally unconcerned ...</i>						<i>High scorers on Agreeableness have an optimistic view of human nature, and value getting along with others...</i>
<b>Negative Emotions</b>	(-24 to -13)	(-12 to -7)	(-6 to -1)	(0 to 5)	(6 to 24)	<b>Negative emotions</b>
<i>Those who score low in Neuroticism are less easily upset and are less emotionally reactive. They tend to be calm...</i>						<i>People high in Neuroticism are emotionally reactive. They respond more emotionally to events than high scorers...</i>

**Table 5.9: Norm Table developed for the interpretation of the Personality Discovery Quiz ( for Full Table see Appendix A)**

0 - 20%	20% - 40%	40% - 60%	60% - 80%	80%-100%	<===== Percentiles
0 to 10	11 to 12	13	14	15 to 16	<b>Verbal Reasoning</b>
					<i>Higher order language-based acquired knowledge and the ability to communicate that knowledge</i>
0 to 9	10 to 13	14 to 16	17 to 19	20 to 24	<b>Fluid Reasoning</b>
					<i>The ability to reason, form concepts, and to solve problems using unfamiliar information or novel procedures</i>
0 to 10	11 to 12	13	14	15 to 16	<b>Perceptual Speed</b>
					<i>The ability to perceive, analyse, synthesise and think with visual patterns including the ability to store and recall visual representations</i>
0 to 9	10	11 to 12	13 to 14	15 to 24	<b>Visual Spatial Reasoning</b>
					<i>The ability to perform automatic cognitive tasks, an aspect of cognitive efficiency</i>

**Table 5.10 Norm Table Developed for the Interpretation of the Cognitive Explorers**



## 5.5. Correlational Analysis

Correlational analysis basically explores whether two or more questions (often called variables) are related to each other or independent from each other. Correlations simply say three things.

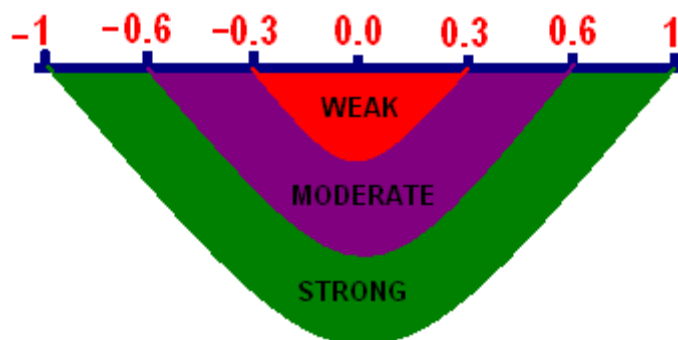
First whether there is a positive pattern emerging i.e. where on average answers are high on question A and high on question B or answers are on average low on question A and low on Question B.

Second whether there is an inverse or negative pattern emerging, i.e. where on average answers on question A are high and answers on Question B are Low, or where on average answers to question A are low and answers to question B are high.

Thirdly whether there is no relationship i.e. on average there is no pattern to the questions at all.

Correlations are measured using what is called Pearson' Correlational Coefficient. Values of this figure fall between minus one and plus one. The general rule of thumb for the strength of these values is below in figure 5.1. As you'll notice a minus value is just as strong as a positive value, i.e. the sign is not associated with strength.

Figure 5.1: Correlations rule of Thumb



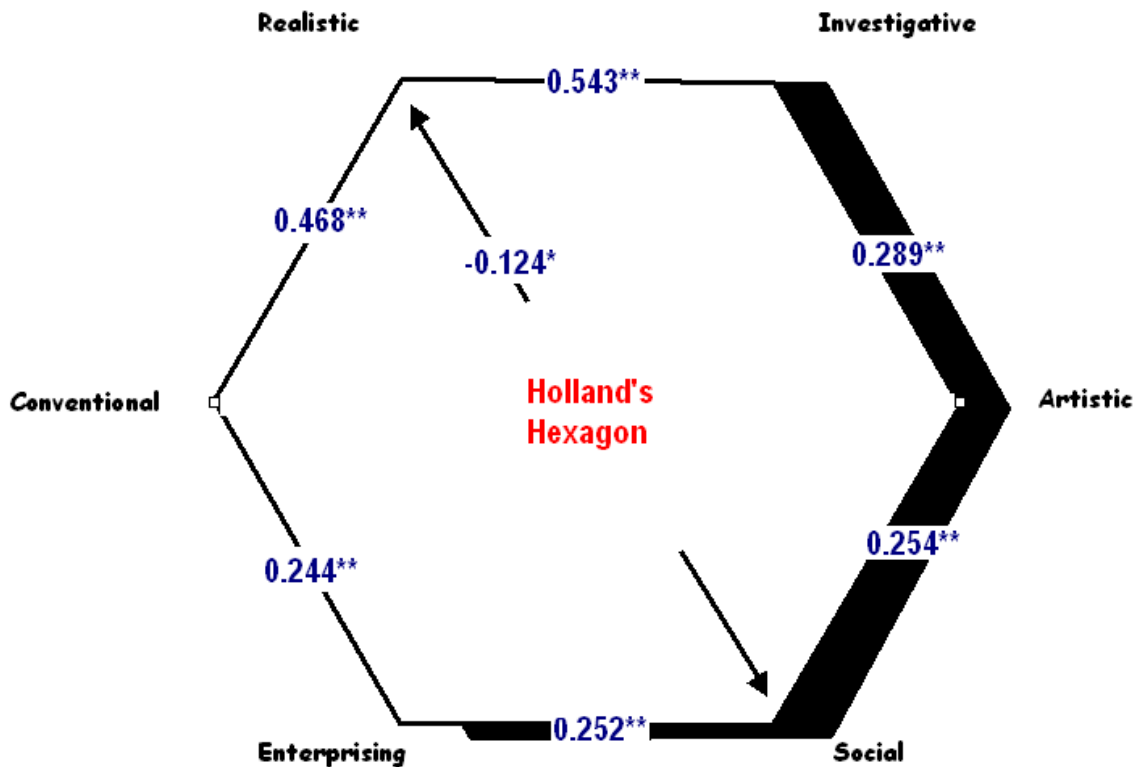
### 5.5.1 Correlational analysis of the Interest Explorer using Holland's Hexagon

Figure 1 below demonstrates the relationships between the career interest types. Holland's model of interests specifies that there is a Hexagonal relationship between the six interest types.

**Figure 5.2: Significant interrelationships within Holland's Model**

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).



In Holland's model the types of the career interests next to one another are the most closely related; those at the opposite side of the hexagon are the least like one another. For Example Investigative should be most like Realistic and Social should be least like realistic. The eGUIDE data demonstrates these relationships and actually fits the model quite well. The numbers shown in the model are Pearson's correlation coefficients. There appears to be a moderate relationship between the Realistic interests and Investigative interests. However although the data fits the theoretical model the actual Correlational values show weak relationships between the interest types in most cases.

## 5.5.2 Correlations between personality traits of the Big Five

**Table 5.11 Correlations between personality traits of the Big Five**

*Pearson Correlation*

	Open	Cons	Extra	Agree	Negat
Openness	1				
Conscientiousness	-.058	1			
Extraversion	.230(**)	.178(**)	1		
Agreeableness	.141(*)	.174(**)	.080	1	
Negative Emotions	-.111	-.249(**)	-.406(**)	-.139(*)	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

The Correlational analysis between the personality traits of the big five show that overall there are mostly weak relationships between the factors of the big five. This is a good thing for the EGUIDE tools as it shows that each of the factors is fairly independent of each other. This means that each factor is measuring something different and that by scoring one way on one factor will not influence scoring another way on another factor. There is one moderate correlation between two of the factors, Extraversion and Negative emotions. This relationship is inverse as it has a minus sign in front of it. This indicates that on average an increase in extraversion means a decrease in negative emotions. In simple terms this means that the more outgoing the people who participated in the EGUIDE were the less reactive to stress they were and less prone to negative emotions. The opposite is also true, that the more quiet and shy the people were the more reactive to stress they were and more prone to negative emotions.

### 5.5.3 Correlations between four sections of the Cognitive Explorer

The Correlational analysis between all of the sections of the Cognitive explorer has thrown up some interesting relationships. First of all it can be seen that the section entitled “Fluid Reasoning “ was independent of all of the other sections, as there appeared to be no relationship between it and all of the other assessments. This is in a way a positive result as it shows that this section of the cognitive explorer is totally different from the other sections and is gathering completely different information about the individual than the other sections. However this also means that a high score on Fluid Reasoning is not predictive of any of the other assessments.

The Strongest relationship in Table 5.12 is between Perceptual Speed and Visual spatial Reasoning. This implies that people who score high on Perceptual Speed will also score high on Visual Spatial reasoning and vice versa. This indicates that there is some element of duplication between the two tests in that some similar abilities are used in both. One hypothesised reason for this is that because the EGUIDE tools are all using visual animated scenarios, the Perceptual Speed questions will also have some elements of Visual Spatial Reasoning.

**Table 5.12 Correlations between four sections of the Cognitive Explorers**  
*Pearson Correlation*

	<b>Verb Reason</b>	<b>Fluid Reason</b>	<b>Perceptual Speed</b>	<b>Visual Spatial Reason</b>
<b>Verbal Reasoning</b>	1			
<b>Fluid Reasoning</b>	.064	1		
<b>Perceptual Speed</b>	.466(**)	-.004	1	
<b>Visual Spatial Reasoning</b>	.388(**)	-.065	.472(**)	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

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