

# A Training Programme Based on the Principles of Social Constructivism and Focused on Developing People for the Future World of Work: An Evaluation

**JEAN COOPER, JOHAN BASSON & PIETER SCHAAP**

*ABSTRACT Human resources development needs to take cognizance of the unique challenges that the workplace of the future is posing to individuals, so that young people can be prepared effectively for the workplace. The objective of this study was to evaluate a training programme based on the principles of social constructivism and focused on developing people for the workplace of the future. A non-equivalent groups design with pre- and post-measurement was used to evaluate the programme. The experimental group consisted of thirty-six individuals and the control group consisted of twenty individuals. The training programme contributed to a significant increase in the creativity, adaptability and self-acceptance of the experimental group (compared to that of the control group). These characteristics will be necessary to succeed in the workplace in future. The training programme thus made a valuable contribution to the development of the experimental group, preparing them for the workplace of the future.*

**KEY WORDS:** Future workplace, training and development, social constructivism, human resources development

## **Introduction**

In recent years, there have been unprecedented technological advances which have left indelible marks on how people live and work (Ridderstrale and Nordstrom, 2004). The already rapid rate of change is increasing exponentially (Molebash and Fisher, 2003) and this poses challenges that the workforce has never had to deal with before (Koschmann, 2000). This means that the workplace that people were trained for ten years ago no longer exists; equally, the workplace as we know it today will no longer exist in ten years' time (Grulke, 2001; Ridderstrale and Nordstrom, 2004). Traditional methods of education and training can therefore also no longer be regarded as sufficient for preparing individuals for the workplace of the future (Senge, 2000; Dixon-Kraus, 1996). If these methods of education are not sufficient any more (Senge, 2000; Dixon-Kraus, 1996), how should one go about training people for a workplace that does not yet exist (Cetron, 1999)? One educational methodology that has been suggested as a possible solution is based on the social constructivist theory of Lev Semenovich Vygotsky (Smith, 2003; Holt and Willard-Holt, 2000). In fact, very valuable work has been done in terms of cognitive and social constructivist approaches to workplace learning (Lave and Wenger, 2003; Billet, 1996, 2000, 2002; Kalantzis and Cope, 1997) of which the most significant contributions were made by Stephen Billet. However, Billet's work (as well as

the others cited above) focuses mainly on learning that takes place *within* the contextual setting of the workplace. But what about young people who have not yet been absorbed into the workplace? Is it possible to apply the insights derived from scholars such as Piaget, Vygotsky, Wertsch, Von Glasersfeld and Billet to young people in the intermediary phase between school and work, *preparing* them for the workplace?

Currently there is a growing perception among employers that school-leavers and graduates are not adequately prepared for the workplace (Holden *et al.*, 2006; Geldenhuys 2006). Holden *et al.* (2006) describe the gaps in needs, expectations and perceptions between what business in the SME sector wants and what the newly graduated market has to offer. Some tertiary institutions, like the higher colleges of education in the United Arab Emirates, are attempting to mitigate this gap by turning towards constructivist learning approaches (Geldenhuys, 2006). Still the problem remains that very little empirical evidence exist regarding the impact that a social constructivist approach to learning could have on preparing young people for the future world of work.

The purpose of this study was to evaluate a training intervention that is based on the principles of social constructivism and that focuses on developing individuals for the future world of work. The study thus aimed to test the following hypotheses:

1. Null hypothesis: the intervention effects no positive change in the participants pertaining to the characteristics needed to succeed in the workplace of the future.
2. Alternative hypothesis: the intervention does effect a positive change in the participants pertaining to the characteristics needed to succeed in the workplace of the future.

Attention is paid, first, to a theoretical description of the future workplace, as well as the characteristics needed to succeed in such a workplace. Second, the theory of social constructivism is discussed. Finally, the methodology that was applied in order to fulfill the purposes of the study is set out.

### **The Future World of Work and the Characteristics Required for Success**

When one thinks about the world of the future, one has to recognize that changes in technology are the major driver of change (Marginson, 2000; Adler, 1992). There is already widespread speculation about the possibilities of nano- and biotechnology (Grulke, 2001; Hiemstra, 1999), but one only needs to consider the growing capabilities of current, everyday information and communication technologies to realize the immense rate of change (Drucker, 1998). Molebash and Fisher (2003) emphasize the impact that Moore's law (that the power of microprocessors doubles every eighteen months) will have on the global economy and society at large. If one adds to this the increasing connectivity provided by the internet, with bandwidth doubling every nine months (Geldenhuys, 2004), one is moving into a world that is smaller than ever before, with a workforce that has more information at its fingertips than people ever dreamt was possible (Drucker, 1998). It thus becomes clear that communication and information technologies like the internet, laptops and handheld computers, cellular phones and wireless applications will have an ever-increasing impact on the way the workplace is organized (Koschmann, 2000). Add to this the increasing changes in societal institutions and values, and one has a new world of work with different rules (Ridderstrale and

Nordstrom, 2004). Of course, when one refers to the 'future world of work' or the 'future workplace', one needs to acknowledge that the future workplace scenarios for all industries and countries can never look exactly the same. Also, what was in the future yesterday will be in the present today and in the past tomorrow and the present workplace scenario of one industry could be the future scenario of another. For the purposes of this study, however, a description is given of the major trends or movements in the overall, hypothetical world of work. The contention is that, although all workplaces across all industries will not display the characteristics listed below to the same degree, all workplaces are at least experiencing some shift towards these characteristics.

One characteristic of the workplace of the future is that the emphasis is moving from large corporations to smaller organizations and stronger relationships (Epstein, 1998). Organizations are becoming more nimble, quick and resilient (Wagner, 2002) and increasingly consist of fluid work teams with employees working in various teams and fulfilling various roles simultaneously (Bass, 2000). Teams are also becoming increasingly diverse and dispersed across the globe (Kerka, 2000). Furthermore, as change and uncertainty are increasingly becoming part of doing business, an organization that wants to succeed needs to be able to embrace uncertainty and be innovative about doing everyday business (Grulke, 2001).

Also, in a world where information abounds, businesses are placing higher value on people who can create value out of knowledge and meaning out of information (Brownstein, 2001). In order to fuel this process, the physical layout of offices and work-team structures are increasingly being designed to enhance communication and collaboration, so that individuals can creatively stimulate new ideas and concepts (Herman and Gioia, 1998). Continuous training and development is also becoming a critical aspect of the workplace (Brownstein, 2001; Cetron, 1999).

This future workplace is demanding specific characteristics of individuals. In order to excel in this world of work, people need to be passionate about change (Boyatzis, 1999). It is not merely about being able to cope with change, but about being totally adaptable, viewing change as a positive inevitability, embracing change and creating change (McGinn and McCormick, 1999). This includes the ability to cope with the stress and frustration that accompanies chaos, uncertainty and change (Ridderstrale and Nordstrom, 2004). Individuals need the ability creatively and innovatively to seek and create opportunities, as well as a willingness to embrace risk in order to pursue such opportunities (Herman and Gioia, 1998). A person who is capable of imaginatively spotting new opportunities as they arise, capitalize on them and move on to the next opportunity is in increasingly high demand in this present-future marketplace (ECerka, 2000).

In addition to the above, the individual needs to be increasingly assertive, confident and self-accepting and needs to know her/himself and her/his strengths, weaknesses and goals - feeling competent and well-liked by others (Branden, 1997). Characteristics such as integrity, authenticity, honesty and consistency are also being accorded ever higher importance, as these are all vital ingredients for managing networks and relationships (Boyatzis, 1999). People with the ability to maintain a healthy balance between a people-orientation and a task-orientation are able to create workplaces that are pleasant, peaceful and non-threatening amid an uncertain and changing environment (Epstein, 1998; Branden, 1997).

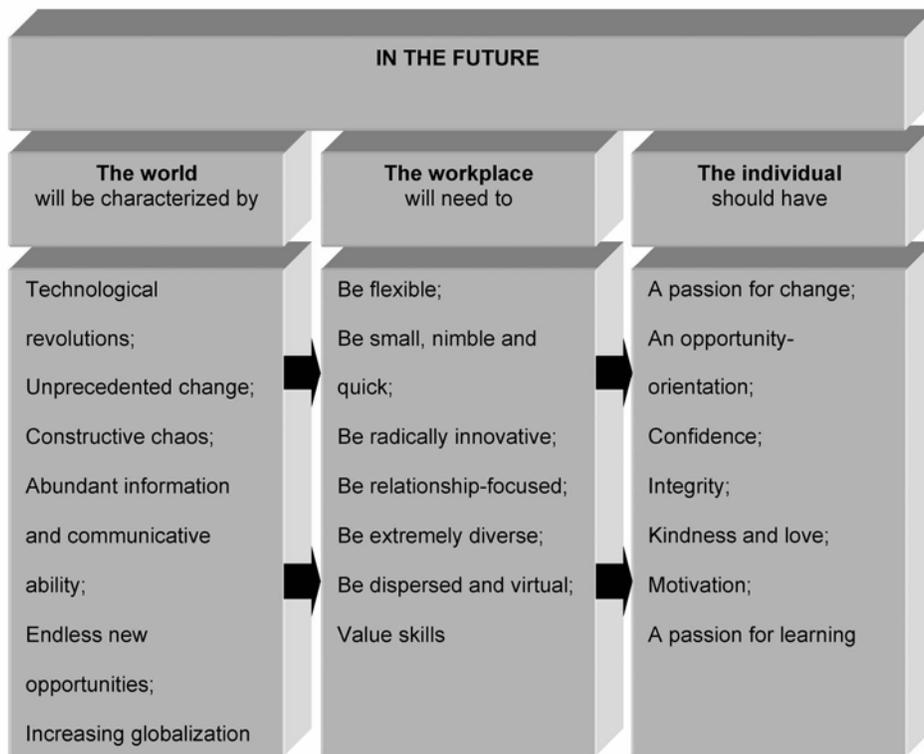
Also, in a world where business and work depend increasingly on relationships and the way those relationships are being managed, one begins to understand the value of attributes such as love, kindness and compassion (Humphreys, 2003). Seeking the best interests of the other party and going out of one's way to serve are all connected to the concept of kindness (Epstein, 1998). In a workplace that is becoming increasingly diverse, a kind and respectful demeanour improves one's chances of having fruitful relationships with team members from different cultural, religious and personal backgrounds (Humphreys, 2003).

A high level of internal motivation, pro-activeness and drive, as well as the ability to inspire and motivate others, also improves one's chances of thriving in the new world of work (Land and Jarman, 1992; Pickett, 1998). Specific traits associated with motivation are tenacity, self-discipline, focus and energy (Porter, 1968). Finally, in a world of abundant information and an exponential growth in knowledge, it is impossible to imagine success without a continuous drive for learning and self-development (Branden, 1997; Senge and Kofman, 1993; Marginson, 2000). This includes an investigative, inquisitive and creative approach to everyday tasks and challenges (Koschmann, 2000). The diagram in Figure 1 gives a broad overview of the literature pertaining to the world of the future, the workplace of the future and the characteristics needed by individuals to succeed in such a workplace.

### **Social Constructivism**

The constructivist movement, as defined and developed by Jean Piaget (Flavell and Piaget, 1963), has grown essentially from dissatisfaction with certain educational methods. Rote memorization, regurgitation of facts and the division of knowledge into different subjects (Dixon-Kraus, 1996) led to a situation where learners were not necessarily able to apply what they had learned in real life (Senge, 2000). The main underlying assumption of Piaget's cognitive constructivism is that individuals are actively involved, right from birth, in constructing personal meaning - that is, their own personal understanding of their experiences (Holt and Willard-Holt, 2000). This action-based theory is thus more concerned with the process of learning than with what is learned (McMahon, 1997).

Cognitive constructivism focuses on a process of learning where the individual constructs her/his own version of truth based on active assimilation and interpretation (Savery, 1994). By contrast, social constructivism, as fathered by Vygotsky (1978), adds another component to the learning process: social interaction.



**Figure 1.** The world, the workplace and the successful individual of the future

The individual's version of 'truth' thus needs to be tested against other individuals' versions in order for the group to arrive at a higher order version of 'truth' (Derry, 1999). Social constructivism thus embraces a dynamic interaction between instructors, learners and tasks, where learners can create their own truth due to their interaction with others (Sternberg and Williams, 1998). The task or problem becomes the interface between the instructor and the learner (Archee and Duin, 1995). The relationship between the instructor and the learner thus becomes central to the learning process (Brown *et al*, 1989).

Social constructivism also emphasizes the importance of culture and context in understanding what is happening in society and constructing knowledge based on this understanding (Billet, 2002; Derry, 1999; McMahon, 1997). It not only acknowledges the uniqueness and complexity of the learner, but actually encourages, utilizes and rewards these as an integral part of the learning process (Gredler, 1997; Wertsch, 1997). Social constructivists also argue that the responsibility for learning should reside increasingly with the learner and that the learner should be actively involved in the learning process (Von Glasersfeld, 1989).

According to a social constructivist approach, instructors have to adapt to the role of being facilitators and not teachers (Brownstein, 2001; Lave and Wenger, 1990). Whereas a teacher gives a didactic lecture which covers the subject matter, a facilitator helps the

learner to get to her/his own understanding of the content (Rhodes and Bellamy, 1999). The emphasis thus turns away from the instructor and the content, and towards the learner (Prawat and Floden, 1994).

The context in which the learning occurs is also regarded as central to the learning itself (Billet, 2002; McMahon, 1997; Di Vesta, 1987). Decontextualized knowledge does not provide the skills to apply our understandings to authentic tasks (Duffy and Jonassen, 1992). One social constructivist notion is that of authentic or situated learning, where the student takes part in activities which are directly relevant to the application of learning and which take place within a culture similar to the applied setting (Brown *et al*, 1989; Gredler, 1997). Billet (2000) refers to the notion of situated learning when he describes communities of practice as learning mechanisms in workplaces. Savery (1994) also contends that the more structured the learning environment, the harder it is for learners to construct meaning based on their conceptual understandings. Vygotsky (1978) maintained that instruction is good only when it proceeds ahead of development or, as he called it, within the 'zone of proximal development'. As far as assessment is concerned, social constructivism argues for a dynamic assessment process in which the assessment process forms a dialogical part of the learning process (Holt and Willard-Holt, 2000).

## **Method**

### *Research Design*

A non-equivalent groups design (NEGD) was followed, based on a pre-test and post-test of both an experimental and a control group, as suggested by Trochim (2002). Only the experimental group was exposed to the intervention. The control group was included in the study to control the possible history-effect as a threat to the internal validity of the study. The non-equivalent groups design is a quasi-experimental design and is widely used in social research. It differs from a pure experimental design in that the groups are not randomly assigned (Trochim 2002).

### *Sampling*

In this study thirty-six people were included in the experimental group. They were chosen because they had already enrolled for the six-month training intervention that was to be evaluated. The participants were all between the ages of 18 and 25. Fourteen participants were female, and twenty-two were male. The experimental group members were not engaged in any formal secondary or tertiary studies at the time, although all of them had completed secondary school and some of them already had tertiary qualifications.

In selecting the control group, care had to be taken to select a group that would provide an adequate control. In order to ensure that the two groups could be validly compared in terms of previous exposure as well as motivation levels, the main criterion was that the control group, like the experimental group, should be in the same intermediary phase between school and work, and should also be actively involved in some way or another in preparing themselves for the workplace. Another criterion was that the control group should not have been exposed to the training intervention

or elements thereof. For the reasons mentioned above, the control group comprised twenty second-year commerce students from the University of Pretoria, ranging in age from 20 to 22. Ten members were male and ten were female. They were all in the intermediary phase between school and work and they were all actively involved in preparing themselves for the workplace. The fact that they had already successfully completed their first year of studies, coupled with the fact that they (out of a class of more than fifty) decided to take part in the study, is a further positive indicator pertaining to motivation levels. During the six-month period that the experimental group participated in the training programme under review, the control group continued with their daily class routine. In terms of the control group not being exposed to the social constructivist training programme or elements thereof, it is significant that second-year students were chosen: the undergraduate commerce programme at the University of Pretoria is not at all structured in a social constructivist manner. Classes are very big (fifty plus); students do not form learning communities in small groups but attend their respective programmes individually; the programme is divided into separate subjects with a strong focus on conveying content and assessment is done according to traditional examination methods. Thus, although one can never create a true experimental situation where members of a control group are not exposed to any form of social constructivist learning whatsoever in their academic or personal lives, the research team felt confident that the control group experience was significantly removed from true social constructivism to provide an adequate control for the purposes of the study.

#### *The Training Intervention*

The training intervention was designed and presented by a private educational initiative consisting of team members from various fields such as psychology, education, theology and business. The intervention was a six-month full-time (8:00 -16:00) programme and was funded by private investors, as well as by the registration fees from the participants themselves. The programme aimed to develop individuals to be successful in the workplace of the future. The primary goal of the programme was to develop certain characteristics that could form the foundation for developing the participants' ability to function in the workplace of the future. Although the characteristics they would require were seldom explicitly focused on, the programme design and training methodology aimed to develop these characteristics as an indirect consequence of the day-to-day training interventions. Some of the themes covered by the training interventions were life skills and personal mastery, entrepreneurship and business, making sense out of history, news and politics, economics and statistical reasoning and environmental awareness.

The training methodology that was followed could be broadly divided into two main categories, namely facilitated group interventions and facilitated one-on-one interventions. While the group interventions allowed for the participants to explore and master the desired learning objectives collaboratively, the one-on-one sessions took place between a learner and a learning partner (coach) and allowed the learner to reflect on her/his progress in relation to her/his personal future goals and objectives. The learning partners and group facilitators were all experienced HRD practitioners qualified in the fields of psychology and education.

The group sessions made extensive use of activities that engaged the learners in a process of discovery and group reflection. Some of these activities were simulated, while others were real life experiences. Many activities were also designed by the learners themselves, which created considerable buy-in from learners into the learning process. One example of a simulated set of activities that was used is a high ropes adventure experience. These activities took the learners out of their comfort zones and stimulated discussions around group dynamics, leadership, interpersonal relationships, uncertainty, change, personal goal-setting and risk. One example of a real life activity that was used was the 'R50 business'. Each student received R50 on a Thursday morning and on the following Monday had to report on the profit she/he had made. Principles of entrepreneurship and business opportunities were derived from this activity. The subject matter was thus experienced by the learners as an integrated whole, situated within the context in which it would be used again in future.

Facilitators steered the process and created an environment in which the learners could arrive at their own conclusions. The learners also came from diverse cultural and academic backgrounds, which extensively influenced discussions and conclusions. Assessment was an ongoing dialogical process between peers, the learning-partner (coach) and the learner, the facilitator and the learner and self-assessment. Except for the psychometric assessment that was conducted as part of this study, assessment of progress never took place by means of a test or exam and was continuously used to set new development targets and to celebrate targets that had been reached. Table 1 compares the practical implementation of the training intervention with the principles of social constructivism.

### *The Research Process*

Based on the literature review, a number of specific characteristics were identified as necessary for success in the workplace of the future. A battery of psychometric instruments was compiled to measure these characteristics. The pre-test for the experimental group was done on the first day of the training programme and the post-test on the last day. There was thus a six-month period between the pre-test and the post-test for the experimental group. The control group also had a period of six months between the pre- and post-tests, but were not exposed to the training intervention. The control group's tests were administered during class time, as they all continued with their day-to-day university classes over the six-month period. The testing conditions for both groups were very similar, as both groups were tested under controlled classroom conditions.

### *Measurement Instruments*

The psychometric battery that was used as the assessment instrument consisted of sixteen tests from the Situation Specific Evaluation Expert (SpEEEx) and Potential Index Batteries (PIB) series. The individual tests that were included in the psychometric battery have satisfactory, well-researched reliability (ranging between 0.58 and 0.92) and validity (ranging between 0.70 and 0.94) statistical records (Schaap 2004). The tests measured the following constructs: creativity, stress tolerance, type

**Table 1.** Comparison between social constructivism and the training programme

Aspect	Social constructivist theory	Training programme
The nature of the learner	<ul style="list-style-type: none"> <li>• Each learner is unique.</li> <li>• The background, culture and symbol systems (e.g. language) of the learner form an integral part of the learning process.</li> <li>• The learner has ownership of and is actively involved (as a whole person) in the learning process.</li> <li>• The focus is the learner and her/his agenda.</li> </ul>	<ul style="list-style-type: none"> <li>• Each learner had a unique learning programme, based on her/his personal development objectives.</li> <li>• In group discussions, attention was paid to hearing all points of view.</li> <li>• Activities and topics were selected based on the learners' wants and needs. This was done in collaboration with the learning partner (coach).</li> </ul>
The role of the instructor	<ul style="list-style-type: none"> <li>• The instructor facilitates the learning process and does not teach content.</li> <li>• The instructor creates the environment for learning to take place.</li> <li>• The instructor keeps the focus on the learner and her/his agenda.</li> <li>• The relationship between the instructor and the learner is vital.</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitators were selected and trained according to the key requirements of the facilitation process.</li> <li>• Each facilitator was measured according to the extent that she/he: <ul style="list-style-type: none"> <li>• <i>Elicited buy-in and ownership</i></li> <li>• <i>Focused on the learners</i></li> <li>• <i>Customized for the learners' needs</i></li> <li>• <i>Creatively synthesized after sessions</i></li> <li>• <i>Created and managed energy levels</i></li> <li>• <i>Evoked and sustained interaction</i></li> <li>• <i>Facilitated respect for different views</i></li> <li>• <i>Linked with the overall programme</i></li> </ul> </li> </ul>
The nature of the learning process	<ul style="list-style-type: none"> <li>• Learning is an active process of dynamic interaction between the instructor, the task and the learner.</li> <li>• The learner creates a personal version of the truth that is tested by means of a dialogue between the learner, her/his peers and the instructor.</li> <li>• Learners engage in situation-specific tasks that facilitate the learning process.</li> </ul>	<ul style="list-style-type: none"> <li>• Group interventions consisted of context-specific simulated and real tasks, as well as feedback and discussion.</li> <li>• Problem/solution-based tasks were used for learners to utilize various competencies simultaneously. Facilitated dialogue between learners was used to debrief and unpack the collaborative learning processes.</li> </ul>

(continued)

Table 1. (Continued)

Aspect	Social constructivist theory	Training programme
The selection and sequencing of subject matter	<ul style="list-style-type: none"> <li>Content is not experienced as separate subjects, but as an integrated whole.</li> <li>The level of difficulty of tasks and the complexity of the subject matter should be just above the learner's current level of mastery.</li> </ul>	<ul style="list-style-type: none"> <li>The programme designer built subject matter into integrated experiences and assignments. Learning partners (coaches) gave feedback regarding the level of difficulty/complexity the learner should be exposed to.</li> </ul>
The assessment process	<ul style="list-style-type: none"> <li>Assessment is a dynamic process.</li> <li>It forms part of the learning process and does not threaten the learner.</li> </ul>	<ul style="list-style-type: none"> <li>Assessment consisted of peer assessment, self-assessment, dialogical assessment with learning partners and facilitators. Each learner's development plan was updated after each assessment.</li> </ul>

A/B behaviour, frustration tolerance, self-acceptance, adaptability, internal/external actualisation, conformity/non-conformity and the demonstrative, Samaritan (behaviour), persevering and evaluative social styles. Table 2 indicates how the constructs that were measured are linked to the characteristics that the training programme focused on.

#### Statistical Analysis

The Mann-Whitney U-test was used to determine the significance of the differences between the variation that took place in the experimental group and in the control group over the six-month period between the pre- and post-tests. In this test, each treated entity is compared to each control entity. This test is used when any treated entity can be validly compared to any control entity. The interpretation of the results of the Mann-Whitney U-test is similar to that of the normal *t*-test, except that the U-test uses the sum of rank orders rather than the statistical mean. The statistical decision criterion was set on the level of  $\alpha = 0.05$ . Where results were statistically significant, the practical significance (meaningfulness) and effect sizes were also calculated. The reporting of effect sizes is encouraged by the American Psychological Association in their *Publication Manual* (APA, 1994). For differences between averages the meaningfulness level was set at  $d = 0.5$  (medium effect size) (Cohen, 1988). The meaningfulness (*d*) pertaining to the comparison of the experimental and the control groups is represented as follows (Steyn 1999):

$$d = (X_{E(\text{Post})} - X_{E(\text{Pre})}) / S_{\text{Max}}$$

Where:

*d* = Meaningfulness

$X_{E(\text{Post})}$  = The mean of the post-measurement of the experimental group

Table 2. Constructs measured

Construct measured by psychometric battery	Construct description according to the developers of the psychometric battery (Erasmus and Schaap 2002)	Characteristics that the training programme focused on
Creativity	Imagination; insight and innovation; new approaches to old problems.	Opportunity-orientation Passion for change
Stress	Controls physical and mental symptoms of stress adequately in uncertain situations.	Passion for change Confidence
A/B behaviour	Well-balanced orientation towards people and tasks; creates climate for peaceful, non-threatening and stress-free environment.	Kindness and love Integrity
Frustration tolerance	Copes with frustration caused by uncertainty and provocation.	Passion for change
Self-acceptance	Views self as acceptable, accepted and well-liked by others; feels competent and confident.	Confidence
Adaptability	Accepts change and adapts to change; views change as positive; opposes others' views; generates new ideas; creative and imaginative.	Passion for change Opportunity-orientation
Internal actualization	Considers different options, makes decisions and takes action of own accord; leads for others to follow; achieves.	Motivation
External actualization	Has capacity to follow; adheres to rules and regulations; accepts external authority.	Motivation
Conformity/ non-conformity	Adheres to rules and regulations (or not); accepts traditional views (or not).	Passion for change Integrity
Demonstrative	Verbally expressive; inspiring; manipulative; convincing; talkative; spontaneous; open-minded.	Motivation Confidence Passion for change
Samaritan	Displays sympathy, empathy, companionship; is supportive; assisting; co-operative.	Kindness and love
Perseverance	Adamant; insisting; driving; risk-taking; task-minded; punctual; assertive; arrogant; intolerant; challenging.	Motivation Opportunity-orientation Confidence
Evaluative	Asks questions; investigates; attends to detail; insists on quality.	Passion for learning

$X_{E(Pre)}$  = The mean of the pre-measurement of the experimental group  $S_{Max}$  = The maximum standard deviation between the pre- and post-measurement of the experimental group.

For results with medium and large effect sizes, the Bonferroni adjustment to alpha levels was made (Hsu, 1996).

## Results

Table 3 shows a statistically significant difference between the pre-and post-measurements on the creativity, self-acceptance, adaptability, demonstrative and evaluative scales. The direction of the change in the experimental group was positive in the cases of creativity, adaptability and self-acceptance and negative in the case of the evaluative social style. The differences on the adaptability (large effect size), self-acceptance (medium effect size) and creativity (medium effect size) scales are also practically meaningful according to Cohen's test for meaningfulness (practical significance). If the Bonferroni adjustment to alpha levels is made to rule out coincidental differences, only the difference on the adaptability scale remains significant. However, when doing the Bonferroni adjustment, care should be taken not to discard results that could in fact be valid (Hsu, 1996).

## Discussion

If the Bonferroni adjustment is applied the alternative hypothesis can be fully accepted only for the adaptability of the experimental group in comparison to that of the control group. Still, given the fact that the creativity and self-acceptance differences are also meaningful (practically significant) according to Cohen's formula, and given the danger of discarding valid results through the use of Bonferroni's adjustment, the alternative hypothesis for the dimensions of creativity and self-acceptance is (at least) preliminarily accepted. Participants in the programme were thus significantly more capable of adapting to a continuously changing environment than they were before participating in the training programme. Participants were also able to display relatively higher levels of creativity and creative approaches to problem-solving than they had been prior to the intervention. The levels of confidence and acceptance of self were also relatively increased. The attributes of creativity (Grulke, 2001; Brownstein, 2001; Cetron, 1999; Ridderstrale and Nordstrom, 2004), adaptability (Boyatzis, 1999; Herman and Gioia, 1998; Kerka, 2000; McGinn and McCormick, 1999) and self-acceptance (Branden, 1997; Senge and Kofman, 1993; Koschmann, 2000; Marginson, 2000; Land and Jarman, 1992; Pickett, 1998) are all regarded as essential for succeeding in the workplace of the future.

The demonstrative and evaluative social styles of the participants also underwent a statistically significant (though not a practically meaningful) change. This could mean that participants were relatively more willing to express themselves assertively and to take part in group discussions than they were before the intervention. They were also relatively less evaluative in their social approach, meaning that they would take decisions faster and with less worrying about having every bit of information before taking action. Being willing and able to express oneself, take risks, get

**Table 3.** Differences between the pre- and post-evaluations of the experimental and control groups pertaining to the constructs measured

Construct	Control group (N = 20)				Experimental group (N = 36)				P	d
	Pre-test		Post-test		Pre-test		Post-test			
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.		
Creativity	107.75	13.89	106.55	17.28	109.22	22.87	120.08	13.15	0.01*	0.47†
Stress mental	39.95	13.21	40.50	13.63	33.89	14.67	31.33	13.44	0.19	
Stress physical	88.50	24.38	89.85	25.81	77.67	26.93	73.06	26.61	0.76	
A/B behaviour	147.25	26.93	157.50	29.88	146.36	41.62	160.11	31.72	0.92	
Frustration tolerance	85.20	9.00	86.70	13.07	85.64	20.06	87.97	17.76	0.63	
Self-acceptance	72.35	12.84	75.50	13.28	82.64	12.42	88.44	11.72	0.04*	0.47†
Adaptability	59.75	12.03	57.80	13.37	67.36	17.89	82.69	16.46	0.00**a	0.86††
Internal actualization	74.05	12.88	78.30	14.55	85.11	14.84	93.72	12.12	0.49	
External actualization	61.90	13.30	59.60	13.48	55.78	17.82	45.94	13.97	0.12	
(Non)conformity	83.70	11.67	81.40	10.46	74.03	10.62	73.39	10.28	0.62	
Demonstrative	10.30	6.19	8.95	6.00	11.08	6.63	12.58	6.60	0.01*	0.23
Samaritan	12.25	6.05	12.05	6.05	12.58	5.02	10.17	4.94	0.06	
Perseverance	6.65	3.54	7.00	3.91	7.56	5.57	8.50	5.67	0.74	
Evaluative	8.70	5.08	10.10	6.30	8.25	4.20	7.50	4.84	0.04*	-0.18

*Notes*\*Difference is statistically significant:  $p \leq 0.05$ .†Difference is practically meaningful:  $d = 0.5$  (medium effect size).††Difference is practically meaningful:  $d = 0.8$  (large effect size).\*\*Significant difference after applying the Bonferroni adjustment:  $p \leq 0.004$ .

involved and create action are also regarded as essential attributes for succeeding in the workplace of the future (Ridderstrale and Nordstrom, 2004; Boyatzis, 1999; Epstein, 1998; Branden, 1997).

However, according to the results, the training programme did not have a statistically significant impact on constructs such as stress and frustration tolerance, type A/B behaviour, internal/external locus of control, conformity/non-conformity and the social styles called 'perseverance' and 'Samaritan'. For these dimensions, the zero-hypothesis is accepted. The training intervention was thus partially successful in developing the characteristics that were measured.

## Conclusion

The purpose of this research was to determine whether or not a training programme which was based on the principles of social constructivism was effective in developing individuals for the future world of work. In order to determine this, a psychometric test battery was used to measure a number of constructs that are related to what certain scholars regard as being characteristics needed for success in the future workplace.

First, we need to acknowledge that the idea of a 'future workplace' will remain (at best) a hypothetical one that will keep on changing as we move towards it. Second, we have to admit that many questions regarding developing people for this workplace still remain unanswered as this study indicated only the development of adaptability, creativity and self-acceptance while a score of other characteristics and competencies will very probably also be required in future workplaces. However, this study does add value in that it extends the insights we already have in terms of human learning to the area of developing young people (in the phase between school and work) for the workplace(s) they are about to enter. As all organizations are confronted with the challenges and uncertainties of the future, the way in which we develop young people to enter these organizations should be re-evaluated on a continuous basis. This training programme used a social constructivist approach that acknowledges the fact that people learn best when doing, discovering and sharing. In this way the divide between learning and real life decreases and are we able to also develop 'softer' characteristics such as adaptability, self-acceptance and creativity.

This study had three main limitations. First, due to logistical constraints, the groups were not assigned randomly. Second, due to the cost of the intervention which limited the number of participants to the programme, a Solomon four-group design could not be followed. The Solomon four-group design would require an additional two control groups that did not take part in the pre-test evaluation (Trochim 2002). This would control the effect that the pre-test might have had on the participants. The limited sample size also makes it difficult to generalize these results to the wider population.

A third possible limitation of the study is situated at a more philosophical level. The training programme that was evaluated was based on the educational principles of social constructivism - a markedly post-modern philosophy and approach. In addition to this, the context which forms the backdrop for this study is that of the workplace of the *future* - a context that certainly tends increasingly to the 'post-' side of modernism. The study thus evaluates a *post-modem* training programme, based on a *post-modem* educational philosophy, in order to determine whether or not it effectively develops people for a *post-modem* workplace. However, the methodology which is applied in executing the study is

very modernist and positivist in its approach. It is a methodology where human characteristics are broken down into psychometric constructs which are (almost mechanistically) measured and statistically analysed. This becomes especially problematic when one tries to link each construct measured seamlessly with the exact nuances that the literature associates with the successful individual of the future. The question is whether the world of metaphor, story and dialogical understanding can be subjected to the measurement instruments and research methods of the world of mechanistic and systematic understanding in any valid way. However, this study wishes to communicate its message effectively to the modernist remnants in our present-day institutions responsible for preparing young people for the workplace. It therefore has to be able to express itself in the language and idiom best understood by these institutions. Still, it would be interesting to see how a more qualitative or even narrative research model would have evaluated this training programme.

Further research that could add further valuable insights might be a post-post assessment to indicate the sustainability of the changes that took place. This could most effectively be joined with a qualitative assessment in order to determine the real level of success the experimental group achieved in the future workplace over a longer period of time. From the researcher's subjective experience of the experimental group's development, the question of age may also be of interest. Does age have an impact on the efficiency of a social constructivist learning experience? The age-differential between the two groups was too small to make any conclusions in this regard, although there were stages in the programme where the older participants seemed to be getting more value from the process than their younger classmates.

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