

VIEWS OF INDUSTRY AND HIGHER EDUCATION ON COOPERATIVE EDUCATION IN THE GAUTENG PROVINCE OF SOUTH AFRICA

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ABSTRACT

Limited data on cooperative education is available concerning the views of companies and higher education institutions. The purpose of this research was to compare the views on cooperative education activities and ascertain the current status of company supervisors and heads of academic departments of higher education institutions. The research involved a literature review and an empirical study. A quantitative approach with regard to the method of research was applied. An ex-post facto (non-experimental) research was undertaken by using a questionnaire as research instrument to collect data in three disciplines from a number of company supervisors in industry and heads of academic departments in six higher education institutions in the Gauteng province of South Africa. Research findings indicated that both supervisors and heads of academic departments from the respective sectors either agreed or strongly agreed on constructs related to the basic principles and nature as well as on best practices in cooperative education. No practical significant difference (d-value) was recorded on the constructs between the two abovementioned study populations, indicating major agreement. The findings clearly show a majority support from industry (supervisors of students) and higher education institutions (heads of academic departments) in the province in which this study was conducted. Both supervisors and academics involved in the cooperative education partnerships have confirmed without a doubt how beneficial this strategy of learning is to both industrial and educational environments. Higher education institutions should take note of these findings, since they indicate the importance both industry and academics attach to cooperative education as a valuable teaching methodology.

Key words: Cooperative education, industry supervisors, heads of academic departments, quantitative research

1. INTRODUCTION

For the higher education sector to achieve acceptable levels of competitiveness and to ensure its relevance, higher education institutions (HEIs) should remain in touch with and be watchful regarding the business of education, namely its product, the student of the university (Dunn, 1999:1). Higher education institutions can no longer operate in isolation and must stay abreast and adjust their curricula to the ever changing employer market requirements, to ensure relevancy (Davies & Pillay, 2000:1). One of the ways in which higher education institutions could remain relevant, is by continuing to be involved in cooperative education. The success of the cooperative education programme depends on the effectiveness of the partnership between three role-players, namely the employer, university and students (Dunn, 1999:3). Since companies form an integral part of the cooperative education triangle (Coll & Chapman, 2000:1) employers' continued support is crucial to the long-term success of any academic programme.

A need to regularly determine the status of cooperative education in higher education institutions is evident within this tripartite relationship, both locally and abroad. Since limited data exists on cooperative education world-wide, a comparative quantitative study was undertaken using an availability study in the Gauteng region of South Africa. In higher education institutions and industry, matters related to cooperative education, specifically regarding the basic principles, nature and best practice of this teaching and learning strategy must be ascertained. Academics and supervisors in industry have many unanswered questions regarding the correct terminology to be used, for instance experiential learning, work-integrated learning, cooperative education and cooperative learning. Company supervisors need to know the benefits of cooperative education, what the legal implications are of a student injured at the workplace, what stipend is to be paid to students during training at the workplace, and other relevant issues of concern.

Furthermore, baseline data on cooperative education could clarify confusion and misunderstandings on matters related to this strategy in both education and industry sectors. Senior management of higher education institutions would then be enabled to make informed decisions based on data collected from both environments. Since many

higher education institutions, both locally and abroad, apply the strategy of cooperative education as part of their curricula, the outcome of the research on which this article is based could inform the curriculum in many ways. Finally, employer companies, (industry) together with universities, need to be informed regarding the trends, benefits and value of this teaching and learning strategy in order to remain involved as partners.

The purpose of the research was to determine the current status of cooperative education in Gauteng in South Africa, by collecting baseline data and comparing company supervisors' views with those of heads of academic departments of higher education institutions with regard to biographical data, basic principles, nature and best practice in cooperative education. Six higher education institutions and 14 companies that complied with specific pre- determined criteria were selected for the purpose of this research. Participants were selected from a variety of disciplines where cooperative education is applied.

The article provides details of the research design, population and sample, measuring instruments, data collection procedure, response rate, biographical data, data on the basic principles, nature and best practice of cooperative education and comparative views of study populations. Finally, a summary and conclusions on the research conducted are given.

2. LITERATURE REVIEW

The research on which this article is based was supported by a literature study on the basic principles and nature of cooperative education as well as best practice in cooperative education.

2.1 Basic principles and nature of cooperative education

A literature study on the basic principles and nature of cooperative education focused on constructs applicable in this research and included the concept, benefits, aim, purpose and role of cooperative education.

According to Reeve (2004:189), the concept of cooperative education began in the United Kingdom (UK) in the late 1800s, in the United States of America (USA) in 1906 and in Canada in 1957. Reeve (2004:189) points out that cooperative education is now practised in more than 60 countries around the world, and that it operates on most continents in associations similar to those like the Southern African Society for Cooperative Education (SASCE). Carlson (1999) stresses that although the term *cooperative education* may have originated in the USA, the concept, namely the idea of an integrated curriculum that includes experiential learning, did not. Furthermore, the practice of cooperative education can be traced back to 1903 in Northern England, where a sandwich education programme was introduced at Sunderland Technical College. Other terms used in relation to cooperative education include *professional practice, apprenticeship, articles, candidature, co-op, field-based learning, internships* or *interns, project-based learning* and *school-to work* (Groenewald, 2004:19).

According to Groenewald (2003:1), the original aim of cooperative education is to enhance student learning. The purpose and role of cooperative education can be regarded as multifaceted when the complexity and the various role-players are considered. It must be remembered that from the student's point of view career clarification is the most important (Coll & Eames, 2004:274). One of the purposes of higher education is to prepare people for work, but perhaps a better definition would be that its purpose is to give people the tools with which to reflect and learn from experience (Thorne, 1995:184). According to Coll and Eames (2004:274), students want well-paying jobs soon after graduation.

According to Wessels (2007:32), cooperative education, as a teaching and learning strategy, has many benefits to the role players involved. Garavan and Murphy (2001:282) describe the value of cooperative education to the student as being enhanced student confidence, self-perception and improved social skills, greater practical knowledge and skills and more employment opportunities. According to Breen and Hing (2002:59), cooperative education partnerships benefit universities since it enhances the range and quality of educational offerings, and the university status and reputation in the discipline, thereby enhancing the status and reputation of the cooperative education partnership.

The literature study on the basic principle and nature of cooperative education informed the identification and development of critical areas of inquiry such as the understanding of the concept and terminology used in cooperative education, as well as the aim, purpose, benefits and partnerships in cooperative education. The literature formed the basis for the development of the questionnaire to be used as measuring instrument, to ascertain the views of respondents.

2.2 Best practice of cooperative education

A literature study of the basic principles and nature of cooperative education included best practices, management, policies, technology application, necessary resources and exposure of academic staff to industry, as well as quality management.

According to De Lange and Gilbert (1994:1) and Jacobs (2000:2), most higher education institutions (HEIs) worldwide make use of some form of central office to manage cooperative education. The specific role and functions of cooperative education in an HEI may include, among others, national and international networks, industry liaison, interaction with alumni, staff development and training, budgeting, direct involvement in curriculum development, partnerships with industry, research in cooperative education, promotion of cooperative education and the management and administration of cooperative education (De Lange, 2004).

At institutional level, higher education institutions should have policies in place if cooperative education is to be practised. Policies on cooperative education may vary between institutions, depending on the different needs and requirements. According to Engelbrecht (2003:49), the vision, mission and goals of cooperative education in HEIs must be documented and the policies regarding student eligibility and company participation must be implemented. Furthermore, the policy should include an organisational chart indicating how cooperative education fits into the HEI structure. Lastly, the policy and strategy should be aligned with the requirements for work-integrated learning as set out in the Higher Education Qualifications Framework (HEQF) of South Africa. Industry, professional bodies, academic staff and students should attempt to support this policy (CTP, 2000:11).

According to Engelbrecht (2003:62), technology advances new possibilities to administer and manage cooperative education institutionally by recording data of students placed, monitored and assessed for work-integrated learning. Management information systems (MIS) utilised should improve efficiency and reduce human resource requirements. Systems should be developed according to specific needs. Systems used in South Africa for cooperative education were reported to be outdated in 1995 (Engelbrecht, 2003:62). It is imperative that HEIs in South Africa do more research in this regard since MIS for cooperative education are either outdated or non-existent.

Wessels (2003:2) recommends the provision of the necessary resources for the successful implementation and management of cooperative education within HEI. According to Engelbrecht (2003:260), a number of learning programmes with an experiential learning/work-integrated learning component have failed because the driving force was but a single person with limited influence.

Exposure of academic staff to industry, contributes to “partnership” relationships which is beneficial to all role players. Staff from HEIs with a career-focused educational mandate, such as universities of technology, should stay abreast of the needs and opportunities in the corporate sector. Staff should not limit themselves to the classroom learning environment, but should explore new avenues in order to acquire new knowledge and skills (Engelbrecht, 2003:289).

According to the CHE (2001:18), the cooperative education model in the higher education sector is a good example of community service programmes. Quality management of work-based learning is essential to ensure compliance with requirements as determined by the CHE (CHE, 2004:11).

Considering the above-mentioned, the following research questions were asked as a point of departure in this study:

- What are the views of company supervisors and heads of academic departments of government-subsidised higher education institutions on cooperative education?
- How do they compare on specifically, identified constructs?

The following section discusses the research methodology that was followed during the empirical procedures.

3. RESEARCH METHODOLOGY

A comprehensive literature study was performed to find answers to the stated research questions. The literature study was performed to identify areas to be investigated in the target and study populations. An ex-post-facto (non-experimental) research was undertaken in the field of cooperative education. The purpose of this research was to compare the views of university staff with those of company supervisors regarding biographical information and constructs identified on the basic principles, nature and best practices in cooperative education. On completion of the literature study a questionnaire was developed to be used as measuring instrument. A structured, closed-ended questionnaire was used (quantitative study) to collect data from companies and higher education institutions in the Gauteng province of South Africa. Participants were selected from a variety of disciplines where cooperative education is applied. A quantitative research approach was followed.

3.1 Measurement

A questionnaire was developed to collect data on biographical information, the basic principles and nature of cooperative education and the best practices in cooperative education. The questionnaire consisted of Section A (Biographical information), Section B (Demographic information), Section C (Basic principles and nature of cooperative education) and Section D (Best practices in cooperative education). The questionnaire was piloted and corrected, after which the questionnaires were distributed to and collected from respondents, mostly by hand. Respondents were asked to reflect on their views on a 4-point Likert scale, with the range 1: strongly agree; 2: agree; 3: disagree; and 4: strongly disagree. Questions were clustered into constructs according to the basic principles and nature of cooperative education and best practices in cooperative education. In the former case six constructs were used, while 17 constructs were used in the latter.

Table 1 represents constructs used in the research on the basic principles and nature of cooperative education in cooperative education.

<i>TABLE 1 Clustering of questions (items) into constructs according to basic principles and nature of cooperative education</i>	
BASIC PRINCIPLES AND NATURE OF COOPERATIVE EDUCATION (CONSTRUCTS)	
1	The concept of cooperative education and related terminology
2	The nature of cooperative education
3	The benefits of cooperative education
4	The purpose and role of cooperative education
5	The aim of cooperative education
6	Development in cooperative education

Table 2 represents constructs used in the research on the best practices in cooperative education.

<i>TABLE 2 Clustering of questions (items) into constructs according to best practices in cooperative education</i>			
BEST PRACTICES IN COOPERATIVE EDUCATION (CONSTRUCTS)			
1	Management of cooperative education	10	Exposure of staff to industry
2	Policies and procedures	11	Liaison
3	Management Information system	12	Partnerships
4	Experiential learning	13	Internationalisation
5	Role players involved	14	Promotion
6	Skills development	15	Telematic application
7	Community service learning	16	Quality management
8	Resource provision	17	Graduate placement
9	Funding and financial administration		

3.2 Population and sample

Samples consisted of supervisors from 14 companies and heads of academic departments from government subsidised higher education institutions in the Gauteng

province in South Africa. Companies and HEIs complied with predetermined selection criteria relating to their involvement in work-integrated learning. Sampling sizes were determined according to the availability of persons in the respective target populations. Questionnaires were distributed to each member of the sample, accompanied by a covering letter, emphasising the confidentiality of the information obtained. The sample consisted of 28 supervisors from companies and 18 heads of academic departments in government-subsidised higher education institutions.

Samples were taken from supervisors from a variety of disciplines in the following selected companies/organisations: *Mechanical Engineering*: Nissan SA, SASOL, Spoornet, NECSA & ISCOR; *Nursing*: private hospitals, namely Muelmed Hospital, Eugene Marais Hospital and government hospitals, Pretoria West Hospital and Pretoria Academic Hospital; *Accounting*: Calculus, TAG Incorporated, Moore's & Roland and Telkom. Similarly, samples were taken from heads of academic departments of government-subsidised higher education institutions, and included universities: the University of Pretoria and the University of the Witwatersrand; comprehensive universities: the University of Johannesburg and UNISA; and universities of technology: the Tshwane University of Technology and the Vaal University of Technology.

3.3 Statistical analysis

Data collected from questionnaires was analysed according to descriptive analytical statistics, in collaboration with the Statistical Consultation Services of the North-West University, Potchefstroom Campus. Frequency analysis of biographical data was conducted. Tests on reliability (Cronbach Alpha) and validity (factor analysis) were done on the basic principles and the nature of cooperative education and the best practices in cooperative education. D-values of Cohen (Ellis & Steyn, 2003:4) were used to indicate whether there were any significant differences between the responses of the study populations. The study populations referred to in this study included supervisors of companies and heads of academic departments in higher education institutions.

3.4 Response

From a total of 28 questionnaires distributed to supervisors at companies in the three disciplines, a total of 28 were received back (100% response rate) and from a total of 18 questionnaires distributed to heads of academic departments, 17 were received back (94% response rate). A high response rate is attributable to the fact that the questionnaires were distributed and collected by hand.

4. RESULTS

4.1 Biographical data

Biographical data was collected from supervisors of companies and heads of academic departments of higher education institutions with regard to their age, gender, highest qualification, position in present job and numbers of years of work experience. The biographical profile of supervisors of companies and heads of academic departments in government-subsidised higher education institutions is provided below.

The majority of supervisor respondents in companies in industry were 46 years or older, predominantly male, possessed a degree or diploma, held the position of a supervisor or training manager and had ten or more years of work experience.

The majority of head of department (HOD) respondents in government-subsidised higher education institutions were also 46 years or older, predominantly male, possessed a master's or doctoral degree, held the position of head of department and had 10 years or more work experience.

The similarity of the profiles of the two groups is noted with interest. Males dominate industry and higher education institutions in the posts described. The level of qualifications in higher education institutions is much higher than those in industry, probably since it is a requirement in higher education institutions as compared to industry.

4.2 Presentation and interpretation of data on the basic principles and nature of cooperative education

A Cronbach alpha reliability and factor analysis was performed on constructs related to the basic principles and nature of cooperative education as well as on best practices in cooperative education. A construct (compare Tables 1 and 2) consisted of clustered questions. The constructs that were identified include the concept of cooperative education and related terminology, the nature of cooperative education, the benefits of cooperative education, the purpose and role of cooperative education, the aim of cooperative education and the developments (improvements) in cooperative education.

4.3 A comparison of the differences (d-value and effect size) between the responses of supervisors of companies in industry and heads of academic departments (HODs) in government-subsidised higher education institutions in the Gauteng province in South Africa

The practically significant differences between the following groups were determined using the d-value of Cohen (Steyn, 2005:22), with the aid of the following statistical formula:

$$d = \frac{\bar{X}_1 - \bar{X}_2}{\text{Maximum Sd}}$$

Where \bar{X} = Mean and SD = Standard deviation.

The effect sizes were determined according to the following criteria (Ellis & Steyn, 2003:4):

Small effect size: $d = 0,2$

Medium effect size (^): $d = 0,5$

Large effect size (*): $d = 0,8$

According to Ellis and Steyn (2003:4), data with $d,8$, should be considered as practically significant, since it is the result of a difference having an equal or large effect.

It must be noted that only large effect sizes (0,8) were selected to indicate differences in opinions of respondents (Ellis & Steyn, 2003:4).

The differences are presented in Table 3.

TABLE 3 The differences between the responses of supervisors of companies in industry and academic heads of departments (HODs) of government-subsidised higher education institutions on the basic principles and nature of cooperative education

CONSTRUCT	GROUP	MEAN (\bar{X})	STANDARD DEVIATION (SD)	D-VALUE
The concept of cooperative education	Supervisor	2,37	0,48	0,15
	HOD	2,44	0,40	
The nature of cooperative education	Supervisor	2,08	0,45	0,04
	HOD	2,06	0,39	
The benefits of cooperative education	Supervisor	1,71	0,65	0,18
	HOD	1,59	0,40	
The purpose and role of cooperative education	Supervisor	2,39	0,43	0,70 ^
	HOD	2,09	0,37	
The aim of cooperative education	Supervisor	2,14	0,77	0,42
	HOD	1,82	0,64	
Improvement of cooperative education	Supervisor	1,56	0,48	0,50^
	HOD	1,78	0,41	

According to Table 3, the following results have been reported:

With regard to the construct on the *concept* of cooperative education, a small effect size (d=0,15) between the responses of supervisors and HODs was recorded. This means that supervisors in companies and academic HODs do not disagree regarding the usage and familiarity of the concept of cooperative education. There is no practically significant difference between supervisors and HODs on the concept of cooperative education.

With regard to the construct on the *nature* of cooperative education, a small effect size (d=0,04) was recorded between the responses of supervisors and HODs,. This means that supervisors in companies and academic heads of departments in higher education institutions (HEIs) have no difference of opinion with regard to the practice of cooperative education in HEIs, that cooperative education is a teaching and learning strategy and that it is about the integration of classroom learning with work experience. There is therefore no practically significant difference between the two groups on the nature of cooperative education.

With regard to the construct on the *benefits* of cooperative education, a small effect size ($d=0,18$) was recorded between the responses of supervisors and HODs. This means that supervisors in companies and academic heads of departments in higher education institutions were familiar with the benefits of cooperative education in their specific environments. Therefore, there is no practically significant difference between the two groups on the benefits of cooperative education.

With regard to the construct on the *purpose and role* of cooperative education, a medium effect size ($d=0,70$) was reported between the responses of supervisors and HODs. The lower average (2,09) indicates that HODs were more familiar regarding the provision of support provided by HEIs to companies and students during experiential learning, as well as the application of work-integrated learning, than supervisors (2,39) in companies., With regard to the purpose and role of cooperative education a substantial difference therefore exists between the supervisors in companies and HODs in government-subsidised higher education institutions.

As far as the construct on the *aim* of cooperative education is concerned, a small effect ($d=0,42$) between the opinions of the supervisors and the HODs was reported. This means that both the supervisors of companies and the HODs of HEIs were in agreement that the main aim of cooperative education is to educate students. No practically significant difference therefore exists between the supervisors of companies and HODs in government-subsidised higher education institutions concerning the aim of cooperative education.

With regard to the construct on the *improvement* of cooperative education, a medium effect size ($d=0,50$) between the responses of supervisors and HODs was reported. This means that there was a greater agreement among supervisors in companies in industry than among academic heads of departments in higher education institutions concerning the improvement of experiential learning and liaison with companies. Therefore it is clear that a substantial difference exists between supervisors in companies and HODs in government-subsidised higher education institutions, concerning the improvement of cooperative education.

4.4 Presentation and interpretation of data on the best practices in cooperative education

As in the case of the interpretation of data on the basic principles and nature of cooperative education, a Cronbach alpha reliability and factor analysis was performed. The constructs identified included the management of cooperative education, policies and procedures, management information systems, experiential learning, role players involved, skills development, community service learning, resource provision, funding and financial administration, exposure of staff to industry, liaison, partnerships, internationalisation, promotion, technology application, quality management and graduate placement.

4.5 Comparison of the differences (d-value and effect size) between the responses of supervisors of companies in industry and academic heads of departments (HODs) in government-subsidised higher education institutions in the Gauteng province in South Africa

The same principles for the calculation of effect size were followed as in the presentation and interpretation of data on the basic principles and nature of cooperative education.

The relevant differences are discussed in Table 4.

TABLE 4 *The differences between the responses of supervisors of companies in industry and academic heads of departments (HODs) of government-subsidised higher education institutions on the best practices in cooperative education*

CONSTRUCT	GROUP	MEAN (\bar{X})	STANDARD DEVIATION (SD)	D-VALUE
The management of cooperative education	Supervisor	1,48	0,47	0,31
	HOD	1,63	0,48	
Policies and procedures in cooperative education	Supervisor	1,43	0,47	0,42
	HOD	1,65	0,52	
Experiential learning	Supervisor	1,63	0,49	0,36
	HOD	1,68	0,53	
The role players involved in cooperative education	Supervisor	1,89	0,28	0,25
	HOD	1,97	0,32	
Skills development (learnerships) in cooperative education	Supervisor	2,30	0,75	0,11
	HOD	2,22	0,74	
Community service learning	Supervisor	1,59	0,64	0,50 [^]
	HOD	1,88	0,60	

CONSTRUCT	GROUP	MEAN (\bar{X})	STANDARD DEVIATION (SD)	D-VALUE
Resource provision in cooperative education	Supervisor	2,04	0,44	0,52 ^
	HOD	1,81	0,36	
Exposure of staff to industry	Supervisor	2,06	0,89	0,30
	HOD	1,79	0,59	
Liaison in cooperative education	Supervisor	1,37	0,49	0,04
	HOD	1,35	0,49	
Partnerships	Supervisor	1,52	0,40	0,28
	HOD	1,65	0,46	
Internationalisation in cooperative education	Supervisor	1,54	0,41	0,25
	HOD	1,68	0,56	
Promotion of cooperative education	Supervisor	2,22	0,75	0,11
	HOD	2,12	0,93	
Technology application in cooperative education	Supervisor	1,68	0,53	0,09
	HOD	1,73	0,44	
Quality management in cooperative education	Supervisor	2,44	0,64	0,63^
	HOD	2,00	0,70	
Graduate placement in cooperative education	Supervisor	1,96	0,52	0,03
	HOD	1,94	0,66	

The following results were reported (as presented in Table 4):

With regard to the construct on the *management* of cooperative education, a small effect size ($d=0,31$) between responses of supervisors and HODs was recorded. This means that no difference exists between supervisors and academic heads of departments and that cooperative education can be properly planned and executed within HEIs. It also means that guidelines for students and supervisors can be included in the study material of experiential learning students. It can then be concluded that practically no significant difference exists between supervisors of companies and HODs in higher education institutions, concerning the management of cooperative education.

With regard to the construct on *policies and procedures* in cooperative education, a small effect size ($d=0,42$) between the responses of supervisors and HODs was recorded. This implies that there is no difference between supervisors of companies in industry and academic heads of departments in higher education institutions regarding their views on the inclusion of guidelines for students and supervisors in the study material used for experiential learning. It can then be concluded that there is practically no significant difference between the two groups concerning the importance of policies and procedures related to cooperative education.

With regard to the construct on *experiential learning*, a small effect size ($d=0,36$) between the responses of supervisors and HODs was recorded. This means that no difference is indicated between the supervisors in companies in industry and academic heads of departments in higher education institutions concerning the experiential learning process which includes preparation, placement, monitoring, assessment and debriefing of students. This means that no practically significant difference exists between the two groups concerning the experiential learning process in cooperative education.

With regard to the construct on *role players*, a small effect size ($d=0,25$) between the responses of supervisors and HODs was recorded. This means that supervisors of companies and academic heads of departments do not differ on the issue that higher education institutions should only offer programmes that meet the requirements of industry. However, there exists no practically significant difference between supervisors and HODs with regard to the role players involved in cooperative education.

With regard to the construct on *skills development* (learnerships), a small effect size ($d=0,11$) between the responses of supervisors and HODs on learnerships (skills development) was recorded. This implies that supervisors of companies and academic heads of departments in higher education institutions do not disagree on the benefits of learnerships to students and companies. However, there exists no practically significant difference between the two groups on the recognition of the importance of learnerships as skills initiative in the higher education sector.

With regard to the construct on *community service learning*, a medium effect size ($d=0,50$) between the responses of supervisors and HODs was recorded. This means that supervisors of companies in industry agree more than academic heads of departments in higher education institutions that HEIs should be more involved in community service learning. Therefore, there is a substantial difference between the opinions of the two groups on the involvement in community service learning in higher education institutions.

With regard to the construct on *resource provision* in cooperative education, a medium effect size ($d=0,52$) between the supervisors and HODs' responses was recorded. This means that the lower mean of (1,81) obtained by HODs indicates a stronger response of academic heads of departments concerning the provision of resources for cooperative education, than supervisors (2,04). This means that HODs responded much more strongly on the need to provide in human and financial resources for the proper functioning of cooperative education within higher education institutions than supervisors. Therefore, there is a substantial difference between the two groups on their opinions with regard to the provision of resources for cooperative education in higher education institutions.

With regard to the construct on *exposure of staff to industry*, a small effect size ($d=0,30$) between the supervisors and HODs' responses was recorded. This means that supervisors of companies and academic heads of departments do not disagree that academic staff be regularly exposed to the work environment and industry to stay abreast with the latest developments in their field of expertise. Therefore, there exists no practically significant difference between the two groups that academic staff in higher education institutions be exposed to industry on a regular basis.

With regard to the construct on *liaison* in cooperative education, a small effect size ($d=0,04$) between the supervisors and HODs' responses, was recorded. This implies that supervisors of companies and academic heads of departments were not in disagreement regarding company inputs through advisory committees for the long-term sustainability of learning programmes in higher education institutions. However, there exists no practically significant difference between the two groups with regard to the importance of liaison in higher education institutions and industry.

With regard to the construct on *partnerships*, a small effect size ($d=0,28$) between the supervisors and HODs' responses was recorded. This means that supervisors of companies and academic heads of departments were not in disagreement regarding the collective engagement in partnerships by companies with higher education institutions, regarding teaching and learning, research and community service. There exists no practically significant difference between the two groups on partnerships in higher education institutions with industry.

With regard to the construct on *internationalisation* in cooperative education, a small effect size ($d=0,25$) between supervisors and HODs responses was recorded. This means that supervisors of companies and academic heads of departments were not in disagreement regarding the international placement of students for experiential learning in cooperative education. Therefore, there exists no practically significant difference between the two groups on the internationalisation of students in cooperative education.

With regard to the construct on the *promotion* of cooperative education, a small effect size ($d=0,11$) between the supervisors and HODs' responses was recorded. This means that supervisors of companies and academic heads of departments were not in disagreement to promote cooperative education to commerce and industry. It must be noted that there exists no practically significant difference between the two groups on the promotion of cooperative education to industry.

With regard to the construct on *technology application* in cooperative education, a small effect size ($d=0,09$) between the supervisors and HODs' opinions was recorded. This means that supervisors of companies in industry and academic heads of departments in HEIs were not in disagreement regarding the value and application of technology to monitor the progress of students during experiential learning. However, there exists no practically significant difference between the two groups on the importance of technology application on students in cooperative education.

With regard to the construct on *quality management* in cooperative education, a medium effect size ($d=0,63$) between the supervisors and HODs' responses was recorded. This means that academic heads of departments were more strongly in agreement on the usage of a quality management system to ensure quality in cooperative education practices in higher education institutions than supervisors of companies in industry. Therefore a substantial difference exists between the two groups' recognition of the importance of quality management practices in cooperative education in higher education institutions.

With regard to the construct on *graduate placement* in cooperative education, a small effect size ($d=0,03$) between the supervisors and HODs' opinions was recorded. This

means that supervisors of companies and academic heads of departments in higher education institutions were not in disagreement that students should have access to a graduate placement office on campuses of higher education institutions. There exists no practically significant difference between the two groups on the recognition of the importance of a graduate placement office in higher education institutions.

5. DISCUSSION

5.1 Discussion of data interpretation on the basic principles and nature of cooperative education

The purpose of this research was to compare and determine the status of cooperative education on the basic principles and nature of cooperative education by respondents, namely supervisors in companies and heads of academic departments in government-subsidised higher education institutions in the Gauteng province in South Africa.

The Cronbach alpha reliability coefficient was reported. Data was collected and tabulated for interpretation.

Discussions on the basic principles and nature of cooperative education follow below.

5.2 Comparison of supervisors in companies with heads of academic departments in higher education institutions on the constructs of the basic principles and nature of cooperative education

The *means* related to the respondents on all constructs by supervisors of companies in industry and heads of academic departments of higher education institutions never recorded a mean¹ of 3 or above. This implies that all respondents of both these groups either agreed or strongly agreed on the constructs related to the basic principles and nature of cooperative education, and that there was no disagreement on the constructs.

None of the *d-values* exceeded a value of 0,8 and thus no practically significant difference was observed by respondents on all constructs. This means that there was no practically significant difference by supervisors of companies in industry and academic

¹ A mean of 3 used as cut-off.

heads of departments in higher education on all constructs on the basic principles and nature of cooperative education.

5.3 Discussion of data interpretation on best the practices in cooperative education

The purpose of this research was to compare and determine the status of cooperative education on best practices in cooperative education through a survey. This involved supervisors of companies in industry, and heads of academic departments in government-subsidised higher education institutions in the Gauteng province in South Africa.

The Cronbach alpha reliability coefficient was reported. Data was collected and tabulated for interpretation.

It must be noted that only large effect sizes ($d \geq 0,8$) were selected to indicate differences in opinions of respondents (Ellis & Steyn, 2003:4).

Discussions on best practices in cooperative education follow below.

5.4 Comparison of supervisors in companies with heads of academic departments in higher education institutions on the constructs on the best practices in cooperative education

The *means* related to the respondents on all constructs by supervisors of companies and heads of academic departments of higher education institutions never recorded a mean² of 3 or above. This implies that all respondents of both these groups either agreed or strongly agreed on the constructs related to best practices in cooperative education, and there was no disagreement on the constructs.

None of the *d-values* exceeded a value of 0,8 and thus no practically significant difference was observed by respondents on all constructs. This implies that there was no practically significant difference between supervisors of companies in industry and

² A mean of 3 used as cut-off.

heads of academic departments in higher education on all constructs on best practices in cooperative education.

6. CONCLUSIONS

The current views of supervisors of companies as well as heads of academic departments in government-subsidised higher education institutions in cooperative education in the Gauteng region of South Africa are very encouraging.

How could supervisors as well as heads of academic departments in higher education institutions be so positive about the role of cooperative education in educating students? Surely, this must show some evidence of a past experience by both role players of a working relationship. According to Breen and Hing (2002:71), 'the ability to create and sustain fruitful relationships gives organisations a significant competitive advantage'. Gaining such competitive advantage is not only limited to one of the partners in the relationships but is extended to all partners, namely the companies, the educational institutions and the students.

According to the biographical results, the majority of supervisors in companies participating in this study were 46 years or older, predominantly male, held a degree or diploma, held the position of a supervisor or training manager and had 10 or more years of work experience. Similarly, the majority of heads of academic departments participating in this study in government-subsidised higher education institutions were 46 years or older, predominantly male, held a master's or doctoral degree, were appointed on a head of department level and had 10 years or more work experience. It was noted that females were not far behind the male majority dominance as supervisors and heads of departments.

The mean on the basic principles and nature as well as the best practices in cooperative education never recorded three or above on the Likert scale (Steyn, 2005:3) by supervisors of companies in industry or by heads of academic departments in higher education institutions in the Gauteng region. Therefore, all respondents either agreed or strongly agreed with the constructs on the basic principles and nature, as well as on the best practices in cooperative education. In addition, all supervisors in companies and

academic heads of departments in higher education institutions recorded no practically significant differences on all constructs on the basic principles and nature, as well as on the best practices in cooperative education, thus indicating a major agreement by industry and higher education on all constructs in cooperative education in the Gauteng province.

The results clearly indicate a majority support from both industry (supervisors of students) and higher education institutions (heads of academic departments) in the province in which this study was conducted. Both supervisors and academics involved in the cooperative education partnerships have undoubtedly confirmed how beneficial this strategy of learning is to both industrial and education environments.

Higher education institutions should become more aware of the importance of cooperative education, creating the 'cutting edge' of learning programmes. In addition, more research is needed to demonstrate to industry and higher education institutions the benefits associated with the cooperative education partnership.

Finally, the findings of this research may be used as a guide to re-confirm the value and importance of partnerships in the cooperative education venture. Higher education institutions need to take note of these findings, as they indicate how highly both industry and academics value cooperative education as a teaching methodology.

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