



SCALES-paper N200311

# **Early Development of Entrepreneurial Qualities: the Role of Initial Education**

Isobel van der Kuip

Ingrid Verheul

Zoetermeer, June 2003

The SCALES-paper series is an electronic working paper series of EIM Business and Policy Research. The SCALES-initiative (Scientific Analysis of Entrepreneurship and SMEs) is part of the 'SMEs and Entrepreneurship' programme, financed by the Netherlands' Ministry of Economic Affairs. Complete information on this programme can be found at [www.eim.nl/smes-and-entrepreneurship](http://www.eim.nl/smes-and-entrepreneurship)

The papers in the SCALES-series report on ongoing research at EIM. The information in the papers may be (1) background material to regular EIM Research Reports, (2) papers presented at international academic conferences, (3) submissions under review at academic journals. The papers are directed at a research-oriented audience and intended to share knowledge and promote discussion on topics in the academic fields of small business economics and entrepreneurship research.

address: Italiëlaan 33  
mail address: P.O. Box 7001  
2701 AA Zoetermeer  
telephone: + 31 79 341 36 34  
telefax: + 31 79 341 50 24  
website: [www.eim.nl](http://www.eim.nl)

*The responsibility for the contents of this report lies with EIM. Quoting numbers or text in papers, essays and books is permitted only when the source is clearly mentioned. No part of this publication may be copied and/or published in any form or by any means, or stored in a retrieval system, without the prior written permission of EIM.*

*EIM does not accept responsibility for printing errors and/or other imperfections.*

# Early Development of Entrepreneurial Qualities: the Role of Initial Education

Isobel van der Kuip and Ingrid Verheul

Centre for Advanced Small Business Economics  
Faculty of Economics  
Erasmus University Rotterdam  
P.O. Box 1738  
3000 DR Rotterdam  
The Netherlands  
Tel. +31 10 4081398/ 81422  
Fax. +31 10 4089146  
[verheul@few.eur.nl](mailto:verheul@few.eur.nl)

and

EIM Business and Policy Research  
P.O. Box 7001  
2701 AA Zoetermeer  
The Netherlands  
Tel. +31 79 3413634

**Abstract:** The present study attempts to create a better understanding of the role of entrepreneurship education in developing entrepreneurial qualities by confronting theory and practice. It discusses the extent to which entrepreneurship can be taught, and the way in which it should be taught. The focus is on the phase of initial education.

**Version:** June 2003

**JEL-code:** I20, M13

**Keywords:** education, entrepreneurship

**Acknowledgement:** The present report is based in part on a literature survey by Isobel van der Kuip while working at EIM Business and Policy Research, Zoetermeer. The authors would like to thank Andrew Burke, Marilyn Kourilsky, Roy Thurik and Lorraine Uhlaner for comments on an earlier version of the present study, and the anonymous referees for their helpful suggestions. We thank Allan Gibb for providing us with relevant reading material for this study. Ingrid Verheul acknowledges financial support of the Fund Schiedam Vlaardingen e.o. and the Trust Fund Rotterdam.

# 1 Introduction

The importance of entrepreneurship for economic development has been widely acknowledged in recent years. Entrepreneurship is assumed to be a major source of innovation, job creation and growth (Thurik, 1996; Audretsch and Thurik, 2000 and 2001; Carree, Van Stel, Thurik and Wennekers, 2001; Audretsch, Carree, Van Stel and Thurik, 2002). However, it has been proved difficult to fully capture the concept of entrepreneurship since there is no generally accepted definition. Because entrepreneurship is associated with innovation and creating something that did not previously exist, it is often treated as equivalent to new venture creation and, as a consequence, business ownership (Vesper, 1980; Gartner, 1989). Nevertheless, entrepreneurship can also be present within large organizations or outside the business environment<sup>1</sup>. Indeed, entrepreneurial behavior in its broader sense has become more important in our society (Gavron, Cowling, Holtham and Westall, 1998) where people face a more uncertain work environment, with multiple job shifts during a career, greater prospects of becoming self-employed, and where tasks increasingly require qualities such as independence, initiative and creativity (Bridge, O'Neill and Cromie, 1998; Gibb and Cotton, 1998). These entrepreneurial qualities enable individuals to cope with and contribute to rapid social and economic change (OECD/CERI, 1989; Gibb and Cotton, 1998).

In the empirical growth literature education is positively related to the level of economic growth (Krueger and Lindahl, 2001). In particular, the empirical studies specify growth as a function of the initial level of education. Hence, from a societal perspective, both entrepreneurship and the educational system are important for economic growth. However, the importance of education for entrepreneurship has been acknowledged only recently. Developing a framework explaining entrepreneurship, Verheul, Audretsch, Thurik and Wennekers (2002) have included education as one of the determinants of the level of entrepreneurial activity in a country.

Traditionally, the educational system has inhibited the development of entrepreneurial qualities because it taught young people to obey, reproduce facts and to engage in wage-employment after finishing their education. In contrast, entrepreneurs tend to rely on their own judgement, learn through the process of trial-and-error and create and facilitate their own

---

<sup>1</sup> This broader application of the concept of entrepreneurship was already used in 1975 by Nobel price winner Schultz who stated that the concept of entrepreneurship is not limited to business people (Schultz, 1975).

job-environment. The focus in the educational system is on analytical thinking rather than on creative thinking (Kourilsky, 1990). Whereas creative thinking refers to being open to new possibilities, analytical thinking is aimed at explaining facts leading to fixed answers. The old school system created uniformity among students and reliance upon an environment characterized by a high level of certainty. By contrast, entrepreneurship is associated with diversity among individuals having different interests, opinions and qualities and with creating opportunities from an uncertain environment. These differences are considered valuable as variety is important for the functioning of modern societies (Verheul and Thurik, 2001).

Nowadays both scholars and policy makers are becoming aware of the importance of the educational system for entrepreneurship. The educational system creates awareness of alternative career choices and broadens the horizon of individuals, equipping them with cognitive tools and enabling them to perceive and develop entrepreneurial opportunities. Moreover, the educational system can help people to develop qualities that are considered important for entrepreneurship (Reynolds, Hay and Camp, 1999). Although there is considerable debate about the extent to which entrepreneurial qualities can be taught, i.e., about the *teachability* of entrepreneurship, several authors agree that entrepreneurial qualities can be developed through training at an early age (Chell, Haworth and Brearley, 1991; Rushing, 1990; Kourilsky and Hirshleifer, 1976; Kourilsky, 1979; Kourilsky and Campbell, 1981; Kourilsky and Ballard-Campbell, 1984; Kourilsky and Carlson, 1997; Kourilsky and Walstad, 1998). The present study adopts this standpoint and focuses on the development of entrepreneurial qualities in initial – primary and secondary – education in general as opposed to college education and beyond.

The present study attempts to create a better understanding of the role of entrepreneurship education in developing entrepreneurial qualities. Because most of the existing educational programs are not based on clear definitions of entrepreneurship, some theoretical underpinnings of entrepreneurship education are discussed. The aim of the present paper is to provide the reader with an overview of relevant theoretical perspectives on entrepreneurship education. Although not covering any one aspect in detail, it aims to provide a broad picture of the state-of-the-art of the area synthesizing disparate approaches. Section 2 deals with the questions: *What is entrepreneurship?* and *What are entrepreneurial qualities?* The phenomenon of entrepreneurship is investigated by reviewing the (early) literature and an attempt is made to extrapolate entrepreneurial qualities. Combining expert views, we discuss which of the

identified entrepreneurial qualities should be taught, resulting in a set of qualities to be included in entrepreneurship education. Building on this set of qualities in Section 3 entrepreneurship education is discussed from a normative, i.e., prescriptive, perspective, dealing with the following research question: *How should entrepreneurship be taught?*. Hence, the present paper entails a theoretical discussion of entrepreneurship education at the initial level<sup>2</sup>. Section 4 summarizes the findings and concludes giving recommendations for further research and program development.

## **2 Entrepreneurship and Entrepreneurial Qualities**

A review of the early entrepreneurship literature produces different views on what constitutes an entrepreneur and what role the entrepreneur plays in the economic process. In Section 2.1 we will give a short overview of the most important contributors to the development of the concept of entrepreneurship. More current issues concerning the concept of entrepreneurship are dealt with in Section 2.2, such as the trait versus the behavioral perspective on entrepreneurship and the question whether entrepreneurship can be taught or whether it is something people are born with. At the end of this section we will discuss why the present paper chooses to discuss the subject of the development of entrepreneurial qualities in initial education. In the subsequent section we will discuss which entrepreneurial qualities should be included in entrepreneurship education.

### **2.1 Historical Views**

One of the most renowned scholars in the field of entrepreneurship is Joseph Schumpeter. Schumpeter (1934) argues that an entrepreneur is someone who introduces new combinations of means of production. In his view entrepreneurship involves innovation reshaping the industrial structure, i.e., "creative destruction", and creating disequilibrium in the economic process. In contrast, Cantillon (1931) argues that the main role of the entrepreneur is to arbitrate, i.e., harmonize demand and supply, and allocate scarce resources to their most productive uses. Schultz (1975) also sees the ability to deal with disequilibrium as a distinctive characteristic of entrepreneurs. Knight (1921) builds on this line of reasoning arguing that the main role of the entrepreneur is bearing the uncertainty related to changing market conditions and consumer demands. Kirzner (1973) focuses more on the perception of opportunities and the

---

<sup>2</sup> For an early version of the present paper, including some practical examples, such as Mini Society in the United States and Mini Enterprise in the United Kingdom, we refer to Verheul and Van der Kuip (2002).

behavioral reaction to this perception. He proposes that alertness to opportunities is vital to understanding entrepreneurship. According to Shackle (1979) the perception of opportunities is an act of interpretation, and an entrepreneur is an individual endowed with imagination needed for attaching value or meaning to specific information.

## 2.2 Current Issues

When reviewing the different perspectives on entrepreneurship a distinction can be made between those emphasizing the importance of entrepreneurial traits or qualities and those focusing on the behavior or activities of entrepreneurs. Within the first perspective entrepreneurship is regarded as a set of personality characteristics, whereas in the second perspective behavior rather than traits is seen as the basis for distinguishing between entrepreneurs and non-entrepreneurs.

Within the trait approach it is argued that individual personality traits are a necessary ingredient for understanding the phenomenon of entrepreneurship because not all people become entrepreneurs under the same circumstances (Cromie and Johns, 1983). In this view entrepreneurship includes characteristics, such as perseverance, creativity, initiative, propensity to take risks, self-confidence and internal locus of control. Despite its alleged importance the trait approach has been criticized by scholars, such as Gartner (1989) arguing that entrepreneurship research should focus on studying the behavioral aspects of entrepreneurship rather than personality traits. Moreover, Amit, Glosten and Muller (1993) argue that entrepreneurial traits are difficult to observe *ex ante* and that they may not be unique to the entrepreneur. For instance, the propensity to take risks may also be present with proactive managers.

In addition, within entrepreneurship research there is the discussion whether entrepreneurs are *born* or *made*. Assuming that entrepreneurship is inborn, Cunningham and Lischeron (1991) refer to the perspective of the *Great Person School of Entrepreneurship*. According to this school of thought the entrepreneur is considered to have an intuitive ability – a sixth sense – and entrepreneurial traits he or she is born with. In contrast, there are scholars arguing that entrepreneurship can be developed or taught. Empirical evidence of the importance of education for the development of entrepreneurship with individuals is provided by Kourilsky and Walstad (1998), Kourilsky and Esfandiari (1997) and Kourilsky and Carlson (1996).

The present study focuses on the development of entrepreneurial qualities (as opposed to

behavior) within initial education. Development of entrepreneurial qualities will be the basis for fostering any type of future entrepreneurial behavior because qualities or personality traits are underlying behavior, i.e., personality influences attitudes and the way in which an individual perceives of and reacts to the environment. Through incorporating entrepreneurial qualities in the education system a broad group of people is reached, creating awareness of entrepreneurship as an occupational choice and developing basic qualities people can draw upon later in life. This is especially important because people often do not become entrepreneurs immediately after finishing their education, but start a business later in their lives, for instance after a period of wage employment (Peters, Cressy and Storey, 1999; Storey, 1994; Evans and Leighton, 1989). In addition, entrepreneurship education can stimulate corporate entrepreneurship as entrepreneurial qualities are increasingly becoming important in regular wage jobs.

In psychology it is well known that personality is not only hereditary, but it is also influenced by the environment. Among the environmental factors exerting influence on the process of personality formation is the culture in which we are raised, i.e., the norms, attitudes and values of our family, friends and social groups (Robbins, 1997). Because children's personalities are still malleable in early childhood, initial education can play an important role in the development of personality traits or, more specific, entrepreneurial qualities. Accordingly, entrepreneurial qualities are preferably taught in the early years of children's schooling, i.e., in primary and secondary education. Tertiary education can focus on developing more practical qualities, such as business management. Because entrepreneurial qualities tend to correspond more with personality characteristics developed during upbringing than business management qualities, and they are more firmly embedded in a person, it will be difficult to develop entrepreneurial qualities with adults.

### **2.3 Entrepreneurship as a Set of Qualities**

#### ***Entrepreneurship and Entrepreneurial Qualities***

Although many authors have defined entrepreneurship and the related qualities, there is no general accepted definition of entrepreneurship or a set of qualities pertaining to entrepreneurial individuals. The persistence with which scholars have sought after a (general) defini-



tion of entrepreneurship often has been referred to as the hunt for the *heffalump*<sup>3</sup> (Kilby, 1971). Consequently, in the entrepreneurship literature many different terms are used to describe the profile of an entrepreneurial individual, including *skills*, *attitudes*, *characteristics* and *qualities*. Although these concepts do not always refer to the same phenomena, they are often used interchangeably.

Referring to the problem of identification of entrepreneurship competencies Caird (1992) argues that many qualities are labeled as entrepreneurial, including *personality variables*, such as achievement motivation, entrepreneurial drive, creativity, innovation and imagination; *communication skills*, such as negotiation and persuasion; *managerial skills*, such as problem-solving, decision-making, organizing and monitoring; *analytical skills*, such as numeracy and data presentation skills; *career skills*, such as self-awareness and assessment, career planning techniques and self-directed learning; *knowledge*, such as computer literacy and business-related knowledge, and *attitudes*, such as sensitivity to needs and consequences, perception and flexible attitude.

Reviewing these concepts a discrepancy seems to exist with respect to the degree to which they can be taught, i.e., their *teachability*. Whereas attitudes and personality variables refer to underlying values of an individual and, accordingly, can be expected to be relatively difficult to influence, skills tend to be more at the surface and can be more easily developed through education or training.

It is often argued that educational programs should also include the teaching of *managerial* qualities, such as negotiation strategies and marketing, in addition to *entrepreneurial* qualities, such as creativity, autonomy and opportunity seeking. Although in many instances managerial qualities are included in educational programs in addition to entrepreneurial qualities, the present study will focus on entrepreneurial qualities only. These qualities largely correspond with the personality variables as identified by Caird (1992). The reason for this focus is twofold. *First*, entrepreneurship can also occur outside the business sphere as is suggested by the broader definition of entrepreneurship. In this context managerial qualities are less important. As opposed to managerial qualities, entrepreneurial qualities are characterized by a low task- and environmental dependency (Gibb, 1987). *Second*, entrepreneurial qualities can

---

<sup>3</sup>The *heffalump* is a character from A.A. Milne's Winnie-the-Pooh and is, in Kilby's words: "...a rather large and very important animal. He has been hunted by many individuals using various ingenious trapping devices, but no one so far has succeeded in capturing him. All who claim to have caught sight of him report that he is enormous, but they disagree on his particularities" (Kilby, 1971, p. 1).

be trained or taught at an earlier age than managerial qualities because entrepreneurial qualities are more likely to be related to personal characteristics developed during the socialization process.

Despite the lack of consensus about the definition of entrepreneurship, a broad range of characteristics has been cited in the literature distinguishing entrepreneurs from non-entrepreneurs. Taking a broader view of entrepreneurship, it can be argued that these characteristics apply to any member of society. It relates to an entrepreneurial culture, rather than to a group of entrepreneurs, i.e., self-employed people (Gibb, 1987). In fact, Weaver and Henderson (1995) hypothesize and find that individuals tend to have a natural tendency towards entrepreneurship, i.e., individuals possess entrepreneurial characteristics naturally to some degree<sup>4</sup>.

In the past many researchers have tried to filter out entrepreneurial qualities. McClelland (1961) introduced the concept of need for achievement as a distinguishing characteristic of entrepreneurs. He argued that entrepreneurs are people with a high need for achievement, i.e., a tendency to set challenging goals and to reach these goals independently. Rotter (1966) found that an internal locus of control is consonant with need for achievement. In this respect Brockhaus (1982, p. 43) argues that: *"a responsible individual who does not believe that the outcome of a business venture will be influenced by his efforts is unlikely to expose himself to the high penalties that accompany failure"*. In addition, a moderate propensity to take risks has been put forward by some scholars as a distinguishing characteristic of entrepreneurs (McClelland, 1961; Sexton and Bowman, 1986). Other scholars, such as Brockhaus (1980) and Brockhaus and Horwitz (1986), do not find risk-taking propensity to be a distinctive feature of entrepreneurship.

More recently, Kourilsky (1990, p. 138) refers to entrepreneurial spirit as *"an intrinsic inclination to generate divergent ideas and to integrate those ideas with resources and processes to make things happen in a unique way"*. In accordance, DeBono (1992) argues that the essence of entrepreneurship is divergent or creative thinking, which is referred to a lateral thinking. Following Schumpeter's idea of "creative destruction", Kent (1990, p. 6) adds the *action* component to entrepreneurship, describing it as a creative process: *"Entrepreneurship should be defined in the broadest possible context, as a process of creative change. It may*

---

<sup>4</sup> Weaver and Henderson (1995) also contend that although the natural tendency of an individual towards entrepreneurship is high, this does not mean that they will exhibit entrepreneurial behavior to the same degree.

*result in the formation of a new business, but then again it may not*". He also links this to entrepreneurship education in arguing that: *"The purpose of entrepreneurship education should be to foster creative activity and independent action wherever it is needed"* (Kent, 1990, p. 6). This definition clearly displays the broader view on entrepreneurship as it can be present in everyday life.

### ***Identification of Entrepreneurial Qualities***

It is important to identify entrepreneurial qualities because educators need a specific definition of what constitutes entrepreneurship as a starting point for designing educational programs. Defining entrepreneurship as a set of qualities enables a discussion on how these specific qualities can be developed in the educational system. On the basis of the work of several scholars within the field of entrepreneurship education the present section presents a set of entrepreneurial qualities to be included in entrepreneurship education.

Few scholars have linked entrepreneurial qualities to education. The main exceptions are Cotton and Gibb (e.g. Cotton and Gibb, 1992; Gibb and Cotton, 1998; Gibb, 1998), Gasse (1985) and Kourilsky (1980, 1995). Gibb (1998, p. 5) refers to entrepreneurial core skills as *"those capacities that constitute the basic necessary and sufficient conditions for the pursuit of effective entrepreneurial behaviour individually, organisationally and societally in an increasingly turbulent and global environment"*<sup>5</sup>. Drawing from the literature on the characteristics on entrepreneurship, Gibb (1998) argues that entrepreneurial skills that should be taught, include intuitive decision making, creative problem solving, managing interdependency on a *know-who* basis, ability to conclude deals, strategic thinking, project management, time management, persuasion, selling, negotiation and motivating people by setting an example. These skills are based on several underlying qualities, such as self-confidence, self-awareness, a high level of autonomy, an internal locus of control, a high level of empathy with stakeholders, especially customers, a hard working disposition, a high achievement orientation, a high propensity to take (moderate) risks and flexibility.

---

<sup>5</sup> Instead of qualities Gibb (1998) uses the terms capacities and skills.

These *underlying* qualities seem more appropriate to include in educational programs for children than qualities related to business management, because they are closer to personal qualities. Moreover, underlying qualities are likely to be more inherent than business management qualities and should be taught at an early age because it will be difficult to develop these qualities with adults.

Within the Durham University Business School (DUBS) model of enterprise education a distinction is made between different types of entrepreneurial qualities grouped around four components: ideas, planning, doing and self-awareness (see Cotton and Gibb, 1992). *Ideas* include the qualities of opportunity seeking, investigation and creativity; *planning* includes both planning and problem solving; *doing* includes the qualities of risk taking, autonomy, commitment, persistence and initiative and *self-awareness* encompasses self-awareness, self-confidence, initiative and motivation. As is noted in Cotton and Gibb (1992, p. 9) the key entrepreneurial qualities in the DUBS model relate to coping with uncertainty, taking calculated risks, being creative, being independent, taking responsibility and solving problems<sup>6</sup>. These qualities bear close resemblance to the underlying qualities previously discussed.

Gasse (1985, p. 540) provides a similar list of qualities distinguishing entrepreneurs from non-entrepreneurs: need for achievement, creativity and initiative; risk-taking and setting of objectives; self-confidence and internal locus of control; need for independence and autonomy; and motivation, energy and commitment.

Rushing (1990) integrates the different perspectives in past research in a set of entrepreneurial qualities<sup>7</sup>. This set of qualities is consistent with the views of Kourilsky (1980), Gasse (1985) and other scholars (Born and Altink, 1996; Chell, Haworth and Brearley, 1991; Hailey, 1995; Binks 1994; Ray, 1993; Gibb, 1993; Cotton and Gibb, 1992; Herron and Robinson, 1993; Adams and Hall, 1993; Hood and Young, 1993). In the present study Rushing's set of entrepreneurial qualities – including opportunity seeking (Kourilsky, 1995; Cotton and Gibb, 1992), and excluding energy and commitment<sup>8</sup> – will be related to the learning objectives of educational programs. The following set of entrepreneurial qualities is constructed:

---

<sup>6</sup> However, Gibb and Cotton (1998, p. 8) rightly argue that: “Problem solving is very different from creative problem solving”. Hence, it should be noted that the key entrepreneurial qualities outlined in the DUBS model are heavily intertwined.

<sup>7</sup> The set of entrepreneurial qualities proposed by Rushing (1990) is largely based on Lachman (1980), Palmer (1971), McClelland (1965b) and Kourilsky (1980) and includes the following items: need for achievement, creativity and initiative, risk taking and setting of objectives, self-confidence and internal locus of control, need for independence and autonomy, motivation, energy and commitment (Gasse, 1985), and persistence.

<sup>8</sup> Energy and commitment are excluded because there is no consensus about the importance of these values for entrepreneurship in the literature.

1. *Achievement motivation* has been characterized as the tendency to set challenging goals and strive after these goals through own effort (McClelland, 1961). McClelland (1965a) argues that a high need for achievement drives people to become entrepreneurs. According to Kourilsky (1980, p. 182) achievement motivation “*is reflected in a student’s seeking of recognition for and overt exhibition of his/her performance abilities and skills*”. Need for achievement and achievement motivation are treated as synonyms in this study.
2. *Need for autonomy* has been referred to as the desire to be in control (and a fear of external control). People with a high need for autonomy consider individualism and freedom important, and are averse to rules, procedures and social norms (Kirby, 2003)<sup>9</sup>. They want to be independent of others. In the present study the need for autonomy is seen as equivalent to the need for independence as used by Jacobowitz and Vilder (1982).
3. *Creativity* has been described as “*developing new methods instead of using standard procedures*” (Born and Altink, 1996, p. 72). According to Torrance (1967) a distinction can be made between four main components of creativity: *fluency*, the ability to produce a large number of ideas (quantity); *originality*, the ability to produce new and unusual ideas (quality); *flexibility*, the ability to change between approaches; and *innovation*, the ability to (re)define and perceive in an atypical manner<sup>10</sup>. A distinction can also be made between inventing something new (i.e., creativity) and adopting it (i.e., innovation) (see e.g. Holt, 1983).
4. *Initiative* has been defined including “*the motivation to begin work independently, to take the first step, to be adventurous, and to be willing to try new methods*” (Kourilsky, 1980, p. 182). Born and Altink (1996, p. 72) concisely define initiative as “*undertaking business of one’s own accord*”.
5. *Risk taking* refers to the acceptance of risk in undertaking a certain activity, i.e., the probability that an activity is successful is less than 100 percent. In the same context risk-taking can be defined as “*exposing oneself to loss or disadvantage*” (Kourilsky,

---

<sup>9</sup> Kirby, D.A., 2003, *Entrepreneurship*, Chapter 5: The nature, characteristics and behaviour of the entrepreneur, p. 112.

<sup>10</sup> Several scholars argue that creativity is a quality closely related to entrepreneurship and is underlying other entrepreneurial qualities (Heron, Smith-Cook and Sapienza, 1992; Gundry and Kickul, 1996; Crowley, Hisrich, Lankford and O’Cinneide, 1995; Whiting, 1988). According to Hull, Bosley and Udell (1980) creativity (together with risk taking propensity) is a better indicator of venture initiation than achievement motivation and internal locus of control.

1980, p. 182). McClelland (1961) argues that risk taking should be moderate or calculated and dependent upon skill rather than chance.

6. *Opportunity seeking or recognition* involves the search for or the identification of unsatisfied wants and needs in the market place that can be met by introducing a (new) product or service (Kourilsky, 1995).
7. *Goal setting* refers to defining objectives that can be reached by allocating entrepreneurial effort. Entrepreneurship is concerned with attaining goals creatively and autonomously. Goal setting is inherent to this process.
8. *Self-awareness* refers to the degree of realism in the estimate of an individual's own abilities enhancing an adequate response to the environment (Lawler, 1973). An entrepreneurial individual initiates and undertakes actions independently. In this context it can be argued that in addition to adequately assessing one's own capabilities a belief in one's own actions, i.e., *self-confidence*, is important.
9. *Internal locus of control* is the degree to which an individual believes that reinforcements are dependent upon his or her own behavior (Rotter, 1966). An individual who believes that the achievement of an end or goal is dependent upon his/her own ability and actions is characterized by an internal locus of control, whereas an individual who believes that it is the result of luck or other people's efforts is characterized by an external locus of control.
10. *Persistence* has been defined as "*the proclivity .... to stick to a task until it is completed*" (Kourilsky, 1980, p. 182). It may be argued that the persistence with which an individual pursues a certain goal is largely dependent upon motivation, energy and commitment. Perseverance and persistence are viewed as synonyms in the light of the present study.

Although in the entrepreneurship literature it is often argued that many of these qualities are interrelated (McClelland, Atkinson and Clark, 1953; McClelland, 1961) it is unclear *how* these qualities are related and what the implications are of the various interrelationships for teaching entrepreneurial qualities. Teaching entrepreneurial qualities may generate spillover effects in case the taught qualities are related to other qualities. For purposes of simplicity the present study will deal with the qualities separately.

### **3 Teaching Entrepreneurship**

Although entrepreneurial qualities are to some extent present in every individual, we assume that these qualities can be developed further through education. With respect to entrepreneurship education a large gap exists between what is propagated in research, the shaping of educational programs and entrepreneurship in practice. Educational programs usually are not based upon knowledge obtained through research and, if they are, a choice has to be made between several different sets of entrepreneurial qualities, complicating the design of the educational program. Moreover, practitioners, i.e., entrepreneurial individuals, do not always seem to profit from educational programs (Crowley, Hisrich, Lankford and O’Cinneide, 1995; Hailey, 1995; Solomon, Weaver and Fernald, 1994; Stumpf and Shirley, 1994).

In the present section we give an indication of how entrepreneurship education programs should be developed in order to be effective. First, we pay attention to the time frame of entrepreneurship education, i.e., when should entrepreneurship be taught? This is followed by a discussion of how entrepreneurship should be taught, i.e., what are the conditions for entrepreneurial learning? Because entrepreneurship education is important especially at the primary and secondary level, we focus on the implications of entrepreneurial learning for initial education.

#### **3.1 When Should Entrepreneurship Be Taught?**

It is customary to distinguish between three levels of teaching entrepreneurship and accompanying educational programs. In primary school awareness is created of entrepreneurship as a contributor to the economy and as a relevant occupational choice. Early in secondary school pupils are offered the opportunity to become an entrepreneur themselves. Late in secondary school pupils acquire entrepreneurial qualities and motivation (see Kent, 1990 – and all the contributions therein – and Kent, 1989).

Although Kourilsky and Carlson (1997) make a similar distinction between educational programs, they do not explicitly link the contents of educational programs to the level of education. They argue that 'awareness' programs can be offered to groups lacking the basic knowledge of entrepreneurship, whereas 'readiness' programs can be offered to any pupil, including those of a young age, provided they have sufficient awareness. According to Mulder (1997) teaching should involve increasing complexity, starting out with creating awareness

and moving towards the application of entrepreneurial qualities in an experimental setting. Rushing (1990) argues that at elementary school the emphasis should be on the acquisition of entrepreneurial qualities, the middle grades should focus on perceiving and creating business opportunities and the high grades should emphasize business management qualities<sup>11</sup>.

Although these studies differ with respect to the exact timing of teaching entrepreneurial qualities, they agree on the importance of teaching entrepreneurship at an early age, preferably in initial, i.e., primary and secondary, education. Within this time frame the focus of entrepreneurship education shifts away from influencing values and attitudes (awareness) to teaching entrepreneurial qualities at a more practical level (readiness).

### **3.2 How Should Entrepreneurship Be Taught?**

Having discussed which entrepreneurial qualities should be taught and when, we now turn to the question how entrepreneurship should be taught. The concept of learning is introduced and several learning theories are discussed that can form the basis of educational programs. In addition, we pay attention to the conditions for entrepreneurial learning and how this works out at the level of initial education.

#### ***Learning theories and their implications for education***

To construct effective strategies for entrepreneurship education, first we need to have a better understanding of the different learning theories that can be used for developing entrepreneurship education programs. Kourilsky and Carlson (1997) argue that educational programs should be based on learning theory in which complex concepts are broken down into manageable components, with the sequence of steps in decomposition of concepts enhancing the coherency of the curriculum.

Kourilsky and Carlson (1996) and Kourilsky and Esfandiari (1997) distinguish between different learning theories underlying specific entrepreneurship education programs<sup>12</sup>. As reported and cited in Kourilsky and Carlson (1996), these include the theories of generative learning (Wittrock, 1974; Osborne and Wittrock, 1983), learning by doing (Dewey, 1933, 1938), stages of cognitive development (Piaget, 1952) and a taxonomy of cognitive learning objectives (Bloom et al., 1956). These different learning theories each have implications for

---

<sup>11</sup> According to Rushing (1990) entrepreneurial qualities should be taught at an early age and repetition of entrepreneurship education is important to consolidate attitudes and qualities.

<sup>12</sup> Kourilsky and Carlson (1996) analyze the learning theory infrastructure underlying the Mini-Society program and its embedded entrepre-



constructing education programs, or curricula.

The theory of *generative learning* is based on the assumption that the brain actively constructs meaningful relationships between unfamiliar concepts and familiar relevant knowledge and experience. Again, as reported and cited in Kourilsky and Carlson (1996), learning is seen as a generative process of constructing meaning from one's memories, knowledge, and experience (Wittrock, 1974, 1990; Kourilsky and Wittrock, 1992)<sup>13</sup>.

The theory of *experience-based learning* – or learning by doing – advocates that students are personally involved in the learning experience by making decisions and personally bearing the consequences of those decisions. It involves the active participation of the students in real-life problem-solving situations with personal significance (Wittrock, 1990; Kourilsky, 1996).

The theory of *cognitive development* describes the intellectual growth path of a child. Cognitive development is dependent upon the interaction of children with their environment. It distinguishes between four stages of development of a child - sensimotor, preoperational, concrete-operational and formal operations. Children's cognitive processes and perspectives vary significantly with the different stages. Piaget's learning theory indicates that the education system can have an important impact on children's knowledge acquisition as long as curricula development is in line with the learning stages (Wadsworth, 1978, 1989)<sup>14</sup>.

Bloom, et al. (1956) propose a theoretical framework for classifying cognitive objectives within education. It is a hierarchical arrangement of the following *cognitive behavioral objectives*: knowledge, comprehension, application, analysis, synthesis and evaluation. According to this hierarchy the fundamental goal of education is enhancing student's higher order thinking. In practice, education is often centered around the lowest ranked categories of knowledge and comprehension.

### ***Entrepreneurial learning***

Although scholars and trainers generally do not agree on a particular set of entrepreneurial qualities to be developed in initial education, there seems to be consensus regarding the

---

neurship curriculum, YESS!

<sup>13</sup> Generative teaching provides educators with two approaches to facilitate learning: (1) pro-actively acknowledging student's knowledge, biases, motivations, inferences and learning strategies, and (2) introducing relevant and new concepts and directing students to examine these concepts by constructing relationships between the concepts and previous knowledge or experience.

<sup>14</sup> Meijers (1995) argues that the process of developing cognition ideally is in harmony with emotions and volition of the child. The learning environment should enable the individual to attach meaning to what he or she learns.

method of teaching entrepreneurship. Because entrepreneurship is often associated with qualities, such as initiative, creativity and autonomy, several scholars argue that entrepreneurship should be taught in an active and experiential way, stimulating young people to systematically think and act entrepreneurial (Kourilsky, 1974; Kourilsky, 1996; Kourilsky and Carlson, 1997; Gibb, 1987, 1998; Hailey, 1995; Gundry and Kickul, 1996; Crowley, Hisrich, Lankford and O’Cinneide, 1995; Kolb, Lublin, Spoth and Baker, 1987; Solomon, Weaver and Fernald, 1994; Stumpf, Dunbar and Mullen, 1991; Rabbior, 1990).

Next to specifically designed projects aimed at developing entrepreneurial qualities, entrepreneurship can be taught more indirectly, through adopting more entrepreneurial modes of teaching and learning. Gibb and Cotton (1998, p. 11) argue that young people should ‘feel’ and experience the concept of entrepreneurship, rather than just learn it in the more conventional manner. Conventional modes of learning can be confronted with more entrepreneurial modes of learning (Gibb, 1998; Cotton and Gibb, 1992). See Table 1.

**Table 1: Conventional versus entrepreneurial modes of learning**

<b>Conventional approach</b>	<b>Entrepreneurial approach</b>
Contents-oriented	Process-oriented
Teacher-oriented	Student-oriented
Teacher is the expert	Teacher is the facilitator
'Know <i>what</i> '	'Know <i>how</i> and <i>who</i> '
Passive student (receiving knowledge)	Active student (generating knowledge)
Emotional detachment	Emotional involvement
Programmed sessions	Flexible sessions
Imposed learning objectives	Negotiated learning objectives
Concept theory emphasis	Practical relevance of theory
Subject/functional focus	Problem/multidisciplinary focus
Fear mistakes	Learn from mistakes
Teacher is infallible (one-sided learning)	Teacher learns (two-sided learning)
Limited exchange	Interactive learning

Source: Gibb (1998) and Cotton and Gibb (1992).

Gibb and Cotton (1998, p. 11) argue that the emphasis should be on pedagogies that encourage learning: by doing, by experience, by experiment, by risk taking and making mistakes, by creative problem solving, by feedback through social interaction; by role playing, by exploring role models; and by interaction with the adult world.

Entrepreneurial learning should be facilitated through the development of an appropriate learning environment. According to Lodewijks (1995) there is a range of demands that need to be fulfilled in order to create this learning environment. The learning environment should:

- be functional and similar to that where the knowledge is put into practice;
- invite activity: students are stimulated to use the environment in an interactive and integrated manner;
- refer to real-life situations where students are required to use their knowledge in dialogue with the environment and learn how to use knowledge in different contexts;
- include role models and coaches;
- show students how they can learn, stimulating them to take responsibility for their own learning process;
- systematically pay attention to students' awareness of capacities, enabling them to perceive improvements.

This learning environment, facilitating entrepreneurial learning, is largely consistent with the principles of the theory of generative learning and experience-based learning. It enhances cognitive development as students are stimulated to interact with their environment and learn from these experiences. Moreover, and opposing the conventional learning mode, entrepreneurial learning is more likely to cover the whole range of cognitive objectives: knowledge, comprehension, application, analysis, synthesis and evaluation.

### ***Entrepreneurial teaching projects/methods***

Several types of projects have been developed and implemented to teach entrepreneurship in a manner corresponding with the above-mentioned learning principles. Gibb (1998) argues that games, projects and adventure training are most suitable to teach entrepreneurial qualities. In particular games would be suitable to create an environment for experience-based learning. Stumpf, Dunbar and Mullen (1991) advocate the use of behavioral simulations to

develop entrepreneurial qualities. In this view behavioral simulation involves the linkage of objectives to specific roles of instructors and students. For instance, to identify and stimulate entrepreneurial drive, talent and skill the instructor should be a counselor or coach, listening, observing and giving feedback, whereas the student should actively reflect, share insights and explore different viewpoints and experiences. Meijers (1997) hypothesizes that mini-enterprising is a more powerful learning method than behavioral simulations, because it involves the experience of actual consequences of behavior.

Although it is important to develop an environment that is conducive to entrepreneurship in general, it may be that different entrepreneurial qualities require different teaching methods and a different educational environment (Cotton, 1993). In this context *initiative* can be stimulated by facilitating rather than directing the learning process and *persistence* can be fostered by ensuring that pupils are aware of the fact that they control the learning process. Linking initiative to social networking, Gibb (1998) argues that the capacity to take *initiative* is best developed through a 'know who' approach in which children explore their relationships with other people. According to Gibb (2002 and 1998) the quality of *autonomy* should be developed through the training of independent behavior, demonstrating children in exercises what it is like to 'be on your own', exploring the different responsibilities that freedom brings, and interviewing real-time entrepreneurs on the meaning of entrepreneurship and their personal goals. The quality of *risk taking* can be developed through participation of children in projects with uncertain outcomes and discussing 'what-if' scenarios. An example of such a project is organizing a fancy fair where it is difficult to predict in advance the number of participants and their willingness to spend money on (specific) games.

In addition to experiential teaching *creativity* can also be taught through the use of conceptual methods, such as 'mind mapping'. This teaching method aims at building relationships between factors and is performed by writing down a problem and brainstorming on related issues and at the same time establishing linkages between the different issues. This method bears close resemblance to the principles of generative learning.

#### **4 Conclusion and discussion**

Entrepreneurship consists of qualities every individual possesses to some extent (Weaver and Henderson, 1995). The present study deals with the question whether and how entrepreneurial qualities can be enhanced through initial education. Although there is no clear defini-

tion of entrepreneurship and entrepreneurial qualities (Gibb, 1987, 1998; Sexton and Kasarda, 1991; Chell, Haworth and Brearley, 1991) researchers seem to agree on a set of teachable entrepreneurial qualities and the characteristics of an appropriate learning environment.

Entrepreneurial qualities should be taught preferably at an early age because young children are still malleable and entrepreneurial qualities are comparable to personality traits developed during upbringing. Through incorporating entrepreneurial qualities in the education system a broad base of people is reached, creating awareness of entrepreneurship as an occupational choice and developing basic qualities people can draw upon later in life. This is important especially since most people starting a business are between the age of 25 and 40 years old (Storey, 1994).

Whereas the traditional school system hardly favored the development of entrepreneurial qualities, at present a wide variety of entrepreneurship education programs and initiatives has been developed and practiced internationally. A distinction can be made between specially designed entrepreneurship programs, such as Mini-Enterprise programs and the Mini-Society program in the United States, and the introduction of more entrepreneurial teaching modes within the 'regular' education system, such as the Dalton Plan and the *Studiehuis* program in the Netherlands. Although most of these programs seem to contribute to the development of entrepreneurial qualities with students at the initial level of education, this is rarely one of the main objectives. Programs often focus on skills and knowledge instead of qualities, with the development of qualities being an unintended by-product.

These two ways to stimulate the development of entrepreneurial qualities, i.e., through specially designed programs and through entrepreneurial teaching methods in the regular education system, should be further developed and may be combined in the future. Searching for ways to stimulate entrepreneurship, both policy makers and researchers have tended to focus more on the specially designed programs. However, these programs usually have a short time span, tend to reach only a small number of students and are often subject to self-selection. Introducing more entrepreneurial teaching methods in the 'regular' education system may be more effective as a larger number of students can be reached. Moreover, the development of entrepreneurial qualities can be enhanced throughout primary and secondary education, spanning a longer period of time, thereby increasing the chance of the education program to be more effective. It is also possible to combine the two methods by incorporating the specific

entrepreneurship programs into the regular curriculum.

Methods to teach entrepreneurship should also be explored further. Operational definitions of entrepreneurial qualities have to be developed that are comprehensible for researchers and teachers as well as for employers and consultants. In Europe, different school systems exist next to the regular system, such as the systems of Dalton, Montessori, Jenaplan and Rudolf Steiner. A systematic evaluation of these systems may lead to the identification of entrepreneurial teaching elements that can be integrated in the regular school system or entrepreneurship education programs.

Different programs should be evaluated with respect to their effectiveness. This can be done through the testing of entrepreneurial qualities before and after educational programs as well as longitudinal testing. Testing students could in turn foster the awareness of job alternatives and qualities and predict job performance.

It has proved difficult to be difficult to harmonize research on entrepreneurial qualities, education and the practice of entrepreneurship. It is important to include the views of different parties, such as program participants, teachers, advisors, employers and researchers, when reviewing the development of entrepreneurial qualities. Not only are there differences in the perception of the relative importance of entrepreneurial qualities between researchers and other people, there is also disagreement among scholars. Qualities considered important by some scholars are neglected by others<sup>15</sup>. The importance of these disputed entrepreneurial qualities should be further investigated. Moreover, in subsequent studies a clear distinction should be made between the different (mostly psychological) concepts of qualities, attitudes, skills and characteristics.

It can be concluded that the development of adequate entrepreneurship education programs is still in an early phase. For the further development of entrepreneurship education it is important to continue creating awareness of its importance and stimulate learning through information transfer and the exchange of experiences.

The present paper has given an overview of relevant theoretical perspectives on entrepreneurship education, providing a broad picture of the state-of-the-art of the area, dealing with the questions what entrepreneurial qualities should be taught, when and how. Because cultural

---

<sup>15</sup> Among these disputed qualities are responsibility, the ability to cope with uncertainty, problem solving, decision making, flexibility and the willingness to be exposed to change, i.e., uncertainty (Gibb 1987, 1998; Ray, 1993; Gavron, Cowling, Holtham and Westall, 1998; Gundry and Kickul, 1996; Bridge, O'Neill and Cromie, 1998).

differences are likely to play a role in developing effective entrepreneurial teaching programs, the present paper does not suggest one best practice of teaching entrepreneurship, rather it provides some insights into how scholars in the area think about the structuring of educational programs on entrepreneurship.

## References

- Adams, G. and G. Hall, 1993, Influences on the growth of SME's: an international comparison, *Entrepreneurship and Regional Development* 5 (1), 73-84.
- Amit, R.H., Glosten L. and E. Muller, 1993, Challenges to theory development in entrepreneurship research, *Journal of Management Studies* 30 (5), 815-834.
- Audretsch, D.B. and A.R. Thurik, 2001, What's new about the new economy? From the managed to the entrepreneurial economy, *Industrial and Corporate Change* 10 (1), 267-315.
- Audretsch, D.B. and A.R. Thurik, 2000, Capitalism and democracy in the 21<sup>st</sup> century: from the managed to the entrepreneurial economy, *Journal of Evolutionary Economics* 10 (1), 17-34.
- Audretsch, D.B., Carree, M.A., Stel, A.J. van and A.R. Thurik, 2002, Impeded industrial structuring: the growth penalty, *Kyklos* 55 (1), 81-97.
- Binks, M., 1994, Developing entrepreneurial qualities and qualities in higher education: the case of the enterprise in higher education initiative in the UK, paper presented at the Babson Conference on Entrepreneurship in 1994.
- Bloom, B.S., M. Engelhart, E. Furst, W. Hill and D. Krathwohl, 1956, *Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook I: Cognitive Domain*, New York: Longmans Green.
- Born, M.Ph. and W.M.M. Altink, 1996, The importance of behavioural and situational characteristics for entrepreneurial success: an international rating study, *International Journal of Selection and Assessment* 4 (2), 71-77.
- Bridge, S., K. O'Neill and S. Cromie, 1998, *Understanding Enterprise, Entrepreneurship and Small Business*, Houndmills: McMillan Press.
- Brockhaus, R.H., 1980, Risk taking propensity of entrepreneurs, *Academy of Management Journal* 23 (3), 509-520.
- Brockhaus, R.H., 1982, The psychology of the entrepreneur. In: C.A. Kent, D.L. Sexton, and K. H. Vesper (eds.), *Encyclopedia of Entrepreneurship*, 39-57, London: Prentice-Hall.
- Brockhaus, R.H. and P. Horwitz, 1986, The psychology of the entrepreneur, in: Sexton, D.L. and R.W. Smilor (eds.), *The Art and Science of Entrepreneurship*, Cambridge, Mass: Ballinger Publishing Company, 25-60.
- Caird, S., 1992, Problems with the identification of enterprise competencies and the implications for assessment and development, *Management Education and Development* 23 (1), 6-17.
- Cantillon, R., 1931, *Essai sur la Nature du Commerce en Général*, edited and translated by H. Higgs, London: MacMillan.
- Carree, M.A., Stel, A.J. van, Thurik, A.R. and A.R.M. Wennekers, 2002, Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976-1996, *Small Business Economics* 18, forthcoming.
- Chell, E., J.M. Haworth and S.A. Brearley, 1991, *The Entrepreneurial Personality: Concepts, Cases and Categories*, London: Routledge.
- Cotton, J., 1993, *Enterprise Education: Its Characteristics and Benefits*, Enterprise and Industry Education Unit, Durham University Business School: Durham UK.
- Cotton, J. and A.A. Gibb, 1992, *An Evaluation Study of Enterprise Education in the North of England*, Enterprise and Industry Education Unit, Durham University Business School, Durham City, UK.
- Cromie, J. and S. Johns, 1983, Irish entrepreneurs: some personal characteristics, *Journal of Occupational Behaviour* 4, 317-324

- Crowley, M., R.D. Hisrich, C. Lankford and B. O’Cinneide, 1995, The effectiveness of participative (‘hands on’) training programs in entrepreneurship in European second level schools. In Bygrave, W.D., B.J. Bird, S. Birley, N.C. Churchill, M.G. Hay, R.H. Keeley and W.E. Wetzel (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 718-719.
- Cunningham, B. and J. Lischeron, 1991, Defining entrepreneurship, *Journal of Small Business Management* 29 (1), 45-61.
- DeBono, E., 1992, *Serious Creativity: Using the Power of Lateral Thinking to Create New Ideas*, New York: Harper Collins.
- Dewey, J., 1933, *How We Think, A Restatement of the Relation of Reflective Thinking to the Educative Process*, 2<sup>nd</sup> edition, Boston: D.C. Heath and Company.
- Dewey, J., 1938, *Experience and Education*, New York: Macmillan.
- Evans, D.S. and L.S. Leighton, 1989, The determinants of changes in U.S. self-employment, 1968-1987, *Small Business Economics* 1, 111-119.
- Gartner, W.B., 1989, What are we talking about when we talk about entrepreneurship?, *Journal of Business Venturing* 5, 15-28.
- Gasse, Y., 1985, A strategy for the promotion and identification of potential entrepreneurs at the secondary school level. In: Hornaday, J.A., E.B. Shils, J.A. Timmons and K.H. Vesper (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 538-559.
- Gavron, R., M. Cowling, G. Holtham and A. Westall, 1998, *The Entrepreneurial Society*, London: Institute for Public Policy Research.
- Gibb, A.A., 1987, Enterprise culture: Its meaning and implications for education and training, *Journal of European Industrial Training* 11 (2), 3-38.
- Gibb, A.A., 1993, The enterprise culture and education. Understanding enterprise education and its links with small business, entrepreneurship and wider educational goals, *International Small Business Journal* 11 (3), 11-34.
- Gibb, A.A., 1998, Entrepreneurial core capacities, competitiveness and management development in the 21<sup>st</sup> century, Keynote speech at the Internationalizing Entrepreneurship Education and Training 8<sup>th</sup> annual conference, July 26-28<sup>th</sup>, European Business School, Oestrich-Winkel Germany.
- Gibb, A.A., 2002, Creating conducive environments for learning and entrepreneurship – living with, dealing with, creating and enjoying uncertainty and complexity, *Industry and Higher Education*, June 2002, 135-148.
- Gibb, A.A. and J. Cotton, 1998, Entrepreneurship in schools and college education – creating the leading edge, Background paper to the conference to be held at the Department of Trade and Industry Conference Centre, December 8<sup>th</sup> 1998.
- Gundry, L.K. and J.R. Kickul, 1996, Flights of imagination: fostering creativity through experiential learning, *Simulation and Gaming* 27 (3), 334-349.
- Hailey, J., 1995, Training for entrepreneurs: international perspectives on the design of enterprise development programs, *British Journal of Education and Work* 8 (1), 5-15.
- Hébert, R.F. and A.N. Link, 1989, In search of the meaning of entrepreneurship, *Small Business Economics* 1 (1), 39-49.
- Herron, L. and R.B. Robinson Jr., 1993, A structural model of the efforts of entrepreneurial characteristics on venture performance, *Journal of Business Venturing* 8 (3), 281-294.
- Herron, L., D. Smith-Cook and J.J. Sapienza, 1992, Patterns of discovery: heuristics and pre-heuristics in entrepreneurial creativity. In: Churchill, N.C., S. Birley, W.D. Bygrave, D. Muzyka, C. Wahlblin and W.E. Wetzel (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 607-608.
- Holt, K., 1983, *Product Innovation Management: A Work Book For Management in Industry*, London: Butterworth.
- Hood, J.N. and J.E. Young, 1993, Entrepreneurships’ requisite areas of development: a survey of top executives in successful entrepreneurial firms, *Journal of Business Venturing* 8 (2), 115-135.
- Hull, D.L., Bosley, J.J. and G.G. Udell, 1980, Renewing the hunt for the Heffalump: identifying potential entrepreneurs by personality characteristics, *Journal of Small Business Management* (18) 1, 11-18.



- Jacobowitz, A. and D. Vilder, 1982, Characteristics of entrepreneurs: implications for vocational guidance, *Vocational Guidance Quarterly* 30 (3), 252-257.
- Kent, C.A., 1989, Awareness: cornerstone of entrepreneurship education, *Business Education Forum* 44 (7), 35-37.
- Kent, C.A., 1990, Introduction: educating the Heffalump. In: C.A. Kent (ed.), *Entrepreneurship Education: Current Developments, Future Directions*, New York: Quorum books, 1-26.
- Kilby, P., 1971, Hunting the heffalump. In: P. Kilby (ed.), *Entrepreneurship and Economic Development*, New York: Free Press; London: Collier-MacMillan.
- Kirby, D.A., *Entrepreneurship*, London: McGraw-Hill Education.
- Kirzner, I.M., 1973, *Competition and Entrepreneurship*, Chicago: University of Chicago Press.
- Knight, F.H., 1921, *Risk, Uncertainty and Profit*, Boston: Houghton Mufflin.
- Kolb, D., S. Lublin, J. Spoth and R. Baker, 1987, Strategic management development: using experiential learning theory to assess and develop managerial qualities, *Journal of Management Development* 5, 13-24.
- Kourilsky, M.L., 1974, *Beyond Simulation: the Mini-Society Approach to Instruction in Economics and Other Social Sciences*, Los Angeles: Educational Resource Associates.
- Kourilsky, M.L., 1979, Optimal intervention: an empirical investigation of the role of the teacher in experience-based instruction, *Journal of Experimental Education* 47 (4), 339-345.
- Kourilsky, M.L., 1980, Predictors of entrepreneurship in a simulated economy, *Journal of Creative Behavior* 14 (3), 175-198.
- Kourilsky, M.L., 1990, Entrepreneurial thinking and behavior: what role the classroom? In: C.A. Kent (ed.), *Entrepreneurship Education: Current Developments, Future Directions*, New York: Quorum Books, 137-153.
- Kourilsky, M.L., 1995, Entrepreneurship education: opportunity in search of curriculum, *Business Education Forum* 50 (10), 11-15.
- Kourilsky, 1996, *Mini-Society*, (Volumes 1 and 3), Kansas City: Kauffman Center for Entrepreneurial Leadership, E.M. Kauffman Foundation.
- Kourilsky, M.L. and J. Hirshleifer, 1976, Mini-Society versus token economy: an experimental comparison of the effects on learning and autonomy of socially emergent and imposed behavior modification, *Journal of Educational Research* 69 (10), 376-381.
- Kourilsky, M.L. and M. Campbell, 1981, The influence of instructional intervention on entrepreneurial attitudes of elementary school children. In: Sexton, D.L. and P.M. van Auken (eds.), *Entrepreneurship Education*, Baylor University Press, 42-50.
- Kourilsky, M.L. and M. Ballard-Campbell, 1984, Mini-Society: An individualized social studies program for children of low, middle, and high ability, *Social Studies* 75 (5), 224-228.
- Kourilsky, M.L. and M.C. Wittrock, 1992, Generative teaching: an enhancement strategy for the learning of economics in cooperative groups, *American Educational Research Journal* 29(4), 861-876.
- Kourilsky, M.L. and S.R. Carlson, 1996, Mini-Society and YESS! Learning theory in action, *Children's Social and Economics Education* 1 (2), 105-117.
- Kourilsky, M.L. and S.R. Carlson, 1997, Entrepreneurship education for youth: a curricular perspective. In: Sexton, D.L. and R.W. Smilor (eds.), *Entrepreneurship 2000*, Chicago: Upstart Publishing, 193-213.
- Kourilsky, M.L. and M. Esfandiari, 1997, Entrepreneurship education and lower socioeconomic youth: an empirical investigation, *The Urban Review* 29 (3), 205-215.
- Kourilsky, M.L. and W.B. Walstad, 1998, Entrepreneurship and female youth: knowledge, attitudes, gender differences, and educational practices, *Journal of Business Venturing* 13, 77-88.
- Krueger, A.B. and M. Lindahl, 2001, Education for growth: Why and for whom?, *Journal of Economic Literature* 34, 1101-1136.
- Lachman, R., 1980, Toward measurement of entrepreneurial tendencies, *Management International Review* 20 (2), 108-116.
- Lawler, E.E., 1973, *Motivation in Work Organisations*, Monterey CA: Brooks/Cole Publishing Co.
- Lodewijks, J., 1995, Leren in en buiten de school; op weg naar krachtige leeromgevingen (Learning in and around school: on the road to strong learning environments). In: Verwijen-Leijh, R. and F. Stu-

- dulski (eds.), *De Leerling en Zijn Zaak* (The Pupil and His Cause), Utrecht: Adviesraad voor het Onderwijs, 21-57.
- Lumpkin, G.T. and G.G. Dess, 1996, Clarifying the entrepreneurial orientation construct and linking it to performance, *Academy of Management Review* 21, 135-172.
- McClelland, D.C., 1961, *The Achieving Society*, Princeton: Van Nostrand.
- McClelland, D.C., 1965a, Need achievement and entrepreneurship: a longitudinal study, *Journal of Personality and Social Psychology* (1), 4, 389-392.
- McClelland, D.C., 1965b, Achievement motivation can be developed, *Harvard Business Review* 43 (6), 6-24.
- McClelland, D.C., J.W. Atkinson and R.A. Clark, 1953, *The Achievement Motive*, New York: Appleton-Century-Crofts.
- Meijers, F., 1995, *Arbeidsidentiteit: Studie- en Beroepskeuze in de Post-industriële Samenleving* (Labor Identity: Choice of Studies and Occupation in the Post-Industrial Society), Alphen a/d Rijn: Samsom.
- Meijers, F., 1997, Simulatie en identiteit: een onderzoek naar de bijdrage van werksimulaties in het middelbaar beroepsonderwijs aan de ontwikkeling van een arbeidsidentiteit (Simulation and identity: research on the importance of work simulations in vocational training environments for developing labor identity), research proposal ISED (Institute for the Study of Education and Human Development), Rijksuniversiteit Leiden.
- Mulder, R.H., 1997, *Leren Ondernemen: Ontwerpen van Praktijkleersituaties voor het Beroepsonderwijs* (Learning Entrepreneurship: Designing Practical Learning Environments for Vocational Training), Masters Thesis, Erasmus University Rotterdam.
- OECD/CERI, 1989, Towards an enterprising culture: a challenge for education and training, *Educational Monograph* 4, 6-7.
- Osborne, R.I. and M.C. Wittrock, 1983, Lean-Ling science: a generative process, *Science Education* 67, 489-503.
- Palmer, M., 1971, The application of psychological testing to entrepreneurial potential, *California Management Review* 13 (3), 32-38.
- Peters, M., R.C. Cressy and D.J. Storey, 1999, *The Economic Impact of Ageing on Entrepreneurship and SMEs*, Warwick: Warwick Business School and Zoetermeer: EIM Business and Policy Research.
- Piaget, J., 1952, *The Origins of Intelligence of Children*, New York: W.W. Norton.
- Rabbior, G., 1990, Elements of a successful entrepreneurship/economics education program, In: C.A. Kent (ed.), *Entrepreneurship Education: Current Developments, Future Directions*, New York: Quorum Books, 53-66.
- Ray, D.D., 1993, Understanding the entrepreneur: entrepreneurial attitudes, experience and qualities, *Entrepreneurship and Regional Development*, 5 (4), 345-357.
- Reynolds, P.D., Hay, M. and S.M. Camp, 1999, *Global Entrepreneurship Monitor. Executive Report*, Babson College, London Business School and the Kauffman Center for entrepreneurial leadership.
- Robbins, S.P., 1997, *Organizational Behavior: Concepts, Controversies and Applications*, New Jersey: Prentice Hall.
- Rotter, J.B., 1966, Generalized expectancies for internal versus external control of reinforcement, *Psychological Monographs: General and Applied* 80 (1), no. 609.
- Rushing, F.W., 1990, Economics and entrepreneurship in the elementary grades. In: C.A. Kent (ed.), *Entrepreneurship Education: Current Developments, Future Directions*, New York: Quorum Books, 153-164.
- Schultz, T.W., 1975, The value of the ability to deal with disequilibria, *Journal of Economic Literature* 13, 827-846.
- Schumpeter, J.A., 1934, *A Theory of Economic Development*, New York: Oxford University Press
- Sexton, D.L. and N.B. Bowman, 1986, Validation of personality index: Comparative psychological characteristics analysis of female entrepreneurs, managers, entrepreneurship students and business students. In R. Ronstadt, J. Hornaday, R. Peterson, and K. Vesper (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 40-57.

- Sexton, D.L. and J.D. Kasarda, 1991, *The State of the Art of Entrepreneurship*, Boston: P.W.S. Kent Publishing Co.
- Shackle, G.L.S., 1979, *Imagination and the Nature of Choice*, Edinburgh: Edinburgh University Press.
- Solomon, G.T., K.M. Weaver, and L.W. Fernald, 1994, A historical examination of small business management and entrepreneurship pedagogy, *Simulation and Gaming* 25 (3), 338-352.
- Storey, D.J., 1994, *Understanding the Small Business Sector*, London/New York: Routledge.
- Stumpf, S.S, R.L.M. Dunbar and T.P. Mullen, 1991, Developing entrepreneurial qualities through the use of behavioural simulations, *Journal of Management Development* 10 (5), 32-45.
- Stumpf, S.A. and B. Shirley, 1994, Understanding the gaps: research-education-practice. In: Bygrave, W.D., S. Birley, N.C. Churchill, E. Gatewood, F. Hoy, R. Keeley and W.E. Wetzel (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 701-702.
- Thurik, A.R., 1996, Small firms, entrepreneurship and economic growth. In: P.H. Admiraal (ed.), *Small Business in the Modern Economy*, Oxford: Basil Blackwell Publishers, 126-152.
- Torrance, E.P., 1967, Non-test ways of identifying the creatively gifted. In: Gowan, J.C., G.D. Demos and E.P. Torrance (eds.), *Creativity: Its Educational Implications*, New York: John Wiley and Sons.
- Verheul, I., Audretsch, D.B., Thurik, A.R. and A.R.M. Wennekers, 2002, An eclectic theory of entrepreneurship: policies, institutions and culture, in: D.B. Audretsch, A.R. Thurik, I. Verheul and A.R.M. Wennekers (eds.), *Entrepreneurship: Determinants and Policies in a European-US Comparison*, Kluwer Academic Publishers: Boston/ Dordrecht, forthcoming.
- Verheul, I. and A.R. Thurik, 2001, Start-up capital: 'Does gender matter?', *Small Business Economics* 16, 329-345.
- Verheul, I. and I. van der Kuip, 2002, Early development of entrepreneurial qualities: the role of initial education in theory and practice, Strategic Report, forthcoming, EIM Business and Policy Research: Zoetermeer.
- Vesper, K. H., 1980, *New Venture Strategies*, Englewood Cliffs, NJ: Prentice-Hall.
- Wadsworth, B.J., 1978, *Piaget for the Classroom Teacher*, White Plains, NY: Longman.
- Wadsworth, B.J., 1989, *Piaget's Theory of Cognitive and Affective Development*, VA-Lite Plains, NY: Longman.
- Weaver, R.Y. and S. Henderson, 1995, Entrepreneurship in organisations. The Aviall studies: a model for corporate growth. In: Vesper, K.H. (ed.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College, 652-666.
- Wennekers, A.R.M. and A.R. Thurik, 1999, Linking entrepreneurship and economic growth, *Small Business Economics* 13 (1), 27-55.
- Whiting, B., 1988, Creativity and entrepreneurship: how do they relate?, *Journal of Creative Behavior* 22 (3), 178-183.
- Wittrock, M.C., 1974, Learning as a generative process, *Educational Psychologist* 11 (2), 87-95.
- Wittrock, M.C., 1990, Generating processes of comprehension, *Educational Psychologist* 24 (4), 345-376.