Apprenticeship Training as Preparation for Self-Employment

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Many countries in sub-Saharan Africa face severe unemployment problems. These problems are due to high population growth rates and declining economic performance (Charmes, 1990). In Kenya, the population grew at an average rate of four percent annually in the 1970s and started to decline in the 1980s following concerted family planning efforts. By 1991, the annual population growth fell to 3.5%. Despite reduced population growth, the economic growth rate has not kept pace. The unemployment problem is so severe that Kenya will need to produce six million new jobs by the year 2000 (Republic of Kenya, 1989). Achieving the needed 5.6% annual growth rate is elusive (Republic of Kenya, 1986). For example, in 1991, only 90,000 new jobs were created for the 250,000 individuals who left school in that year. Each year thousands of disillusioned young people enter the ranks of the unemployed.

Job seekers who fail to find employment in the "modern sector" inevitably gravitate to the informal sector as employees or as self-employed owners of enterprises. The International Labor Organization (ILO) estimates that only one out of ten dropouts are able to locate employment in the modern sector (ILO, 1988). The remaining nine must seek employment in the informal sector or initiate some type of self-employment.

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In developing countries, the informal sector includes a wide range of small enterprises, ranging from marginal petty trading activities to fairly successful manufacturing and construction businesses. The number of small enterprises in the informal sector has expanded rapidly compared with the heavily capitalized formal sector. Of the 90,000 new jobs that were created in 1991, 60,000 were in the informal sector. The majority of new jobs will continue to come from self-employed individuals in the informal sector.

Education and training are keys to solving the unemployment problem. In the three decades since independence, the Kenyan government has tried to develop a technological skill base by expanding existing technical institutions, building new ones, and supporting those institutions that were set up through public initiatives. More recently, vocational subjects have been introduced into the primary and secondary school curriculum to teach work- and self-employment skills to aid those students who will terminate their education at these levels (Rathgeber, 1988). Beyond the secondary school level, unskilled youth can gain skills through a formal or informal apprenticeship training system.

While apprenticeships provide the technical skills needed for paid employment, it is unclear if apprentices receive the skills they need to be successful at self-employment. This is important because many former apprentices become unemployed for various reasons. For example, at the end of the four-year formal apprenticeship period, companies can release apprentices to seek employment elsewhere. Some former apprentices may be unable to find paid employment, or when they do, may find wages in the smaller firms to be lower than their pay in the larger companies where they had received their training. Due to a lack of employment or underemployment, an increasing number of former apprentices leave formal wage employment and choose to enter into self-employment (Fields, 1990; King, 1990). The situation is similar for the large number of artisans in the country who receive their skill training through the informal apprenticeship training system (ILO, 1988). Many enter self-employment at some point after acquiring sufficient skills through on-the-job training. Job security and wages in the informal sector tend to be less competitive; therefore, former apprentices of the informal apprenticeship system start their own businesses to improve their income and security (Abdel-Fadil, 1983 as cited in House, Ikiara, & McCormick, 1990). The biggest asset that former

apprentices bring to self-employment is technical skill; however, they typically lack business skills. Those who establish their own businesses face a myriad of difficulties related to managing the business. The majority of these businesses have poor growth rates.

The purpose of this study was to explore the extent of entrepreneurial knowledge and skills acquired by apprentices who undergo technical training. The study examined how apprentices acquire entrepreneurial knowledge and skills. The relationship between their competencies and declared interest for self-employment in the future was also examined. The study was guided by the following research questions:

1. How do the formal and informal apprenticeship training systems differ in their emphasis on entrepreneurial knowledge and skills?
2. How are entrepreneurial knowledge and skills acquired by apprentices?

Development of Apprenticeship Training in Kenya

Because of the lack of an established craft tradition in East Africa (King, 1977), skilled workers were imported from India to help the British colonial government construct a railway system to facilitate external trade. The presence of British and Indian craftsmen in Kenya resulted in the development of two systems of apprenticeship training. The British used the school system to create skilled workers while the Indians inadvertently and informally prepared skilled workers through on-the-job training.

The Informal Apprenticeship Training System

The informal apprenticeship system in Kenya developed from Indian craftsmen who were imported into the country at the turn of the century to help the British Colonial government construct a railway line linking the seaport of Mombassa with the interior of the country (King, 1977). With the completion of the railway line, the Indian craftsmen stayed and formed the basis of skilled technical manpower in the country. Their skills were needed to maintain the railway system, operate and maintain factories that were being started to provide goods and services, and erect buildings for the settler community (King, 1977). Some of the Indians, along with new waves of Indian immigrants, started new businesses to offer services needed by the settlers and by their indigenous employees.

People from the local communities were initially engaged as laborers on the railway construction project but gradually, by working alongside the Indians, acquired enough trade skills to work as semi-skilled, and later, as skilled workers. Individual Indian craftsmen, who started small workshops also needed local laborers to assist them. Incrementally, these laborers learned to do skilled work. Indian craftsmen were initially very protective of their skills, fearing that if others developed the skills, they would present a threat to their livelihood. Thus, they kept crucial skills secret from their African laborers (King, 1977). As Indian craftsmen gradually became wealthy, their protective mentality relaxed and they exposed African workers to the skills they previously kept to themselves. This was not an act of charity on the part of the Indians, but one of necessity. As their enterprises expanded, they were required to spend more time on the management side of their businesses and thus needed cheap skilled labor to take their places.

A key characteristic of informal skill training in Kenya has been its accessibility. Once the monopolistic attitude of the Indian craftsmen diminished, the spread of technical skills among indigenous Kenyans was rapid. The indigenous apprenticeship training that developed was characterized by ease of entry and exit. Entry (as remains the case currently) was based on kinship, friendship, and philanthropy (Ndua & Ng'ethe, 1984). Informal apprenticeship training in Kenya had no rigid rules or time constraints about the duration an apprentice would take to learn the trade. Once learners entered into apprenticeships, skills acquisition depended entirely on their aptitude as well as the quantity and variety of work the owner/trainer was undertaking. The apprentice could leave and seek employment elsewhere or start a business at any time. In some cases the owner/trainer re-negotiated new terms as apprentices became more skilled.

With this flexible, non-protectionist mentality, trade skills spread very rapidly in Kenya. The public has been the beneficiary of the abundance of skills as technical services are fairly cheap to obtain within the informal sector. This abundance of skilled craftsmen has helped to provide essential skills in the rural regions of the country. Some of the skilled workers return to their rural villages to establish businesses offering services that were either unavailable or too expensive to obtain from formal sector businesses. Another important contribution of the informal apprenticeship system is the opportunity for large numbers of youth to obtain skill training with

little cost to both the learner and employer, and at no cost to the tax payer. The current formal training system in Kenya lacks the capacity to absorb all the youth who are now obtaining their training from the informal apprenticeship system.

The Formal Apprenticeship Training System

The first formal apprenticeship in Kenya was introduced through the formal school system at the turn of the century (King, 1977). The colonial government was keen on replacing Indian skilled labor with cheaper African labor. Consequently, all African primary schools were vocational. This policy was enforced by providing funds only to schools following established vocational curricula. All students entering school were indentured to the school system. When the students were at school, most of their time was spent in vocational subjects (e.g., agriculture, masonry, and carpentry) where actual goods were produced for sale. The theoretical components of their training were learned at night.

Few of the primary school graduates actually worked in the vocation for which they were trained (King, 1977). Most sought clerical jobs, which paid better wages and provided improved job security compared to skilled occupations. The system of indenture was discontinued after about two decades because it failed to produce cheap skilled African workers. Vocational subjects, however, continued to be offered in primary school, but to a much more limited extent.

After the second world war, a system of trade testing was initiated to provide a mechanism for assessing skills. This also provided a hierarchical grading system for distinguishing competency levels of skilled workers (King, 1977). During this period, a typical formal apprenticeship involved attending a government trade school for a year or two after primary education. This training was then followed by employment in one of the government corporations or departments, or some large corporation in the private sector. During the apprenticeship period the learners would take trade tests at appropriate levels of the program. Since these tests were practical examinations, the tests provided a mechanism for legitimizing and enhancing the status of individuals who had acquired their skills through the informal system. Additional advantages included improving their employment opportunities and securing pay commensurate with their skills in the formal sector. This was essentially the system of apprenticeship that the colonial govern-

ment bequeathed the indigenous government at independence in 1963.

The skilled training system remained unchanged until 1973, when a comprehensive program for the training of craft apprentices was introduced. The Industrial Training Act of 1973 (Republic of Kenya, 1973) clearly stipulated the duration of the apprenticeship program (not less than four years), the content of training for each trade, and the evaluation system to be used as well as the proportion of on-the-job training (OJT) and theoretical training to be provided at government Institutes of Vocational Training Centers (IVTC). In addition, the Act provided wage guidelines for apprentices while in training. A minimum of two years of secondary education was established as an entry requirement. Proficiency examinations, patterned after traditional examinations in formal education, were also introduced.

To encourage industries to train their workers in accordance with the new training scheme, a levy was introduced requiring contributions from all medium and large companies. Those who provided training for their workers were entitled to an end-of-year reimbursement from the fund. Soon after the introduction of the training levy, the government encouraged employers to take on apprentices without any obligation to retain them at the end of the four years of apprenticeship.

Method

The purpose of this study was to explore how entrepreneurial knowledge and skills are acquired by apprentices and how they differ across formal and informal apprenticeship training systems. The study was limited to apprenticeship training within the service sector, specifically the motor vehicle repair and metal manufacturing sectors. This limitation was applied because many apprentices who pursue self-employment tend to start a business in metal manufacturing or motor vehicle repair. These sectors include skill areas such as welding and fabrication, motor vehicle mechanical and electrical repair, panel beating, spray painting, and machining.

Subjects

This study was limited geographically to the city of Nairobi, which is the largest urban center in Kenya with a population of over two million. A large number of modern and informal sector enter-

prises are concentrated in and around Nairobi, more than any other region in the country. Many apprentices undergo their training within these organizations.

The Directorate of Industrial Training (DIT) was contacted to obtain access to the formal apprentices under its jurisdiction after an appropriate research permit had been obtained. The DIT receives, from individual companies, the names of all apprentices due for institutional training. Apprentices are then sent to one of three DIT vocational institutions, which are located in Nairobi, Mombassa, or Kisumu. According to the DIT officer responsible for assigning apprentices, a form of randomization is achieved because the names of apprentices are entered onto a list as they come in from companies all over the country. Assignment to each vocational institute is done by going down the list until the appropriate number of apprentices is identified to fill a class.

The DIT provided access to the National Industrial Vocational Training Center (NIVTC), which is located in Nairobi. From the class list of students in the trades that were relevant to this study, 24 apprentices were selected using stratified sampling. In small classes (e.g., motor vehicle mechanics and motor vehicle electrical), nearly all the apprentices on the class list were invited to participate in the study. In the mechanical fitting class, 13 apprentices were selected from a class of 25.

A second group of formal apprentices was drawn from the National Youth Service (NYS). Access to the NYS Engineering Craft Training School was obtained from the adjacent NYS headquarters. The Engineering Craft Training School prepares apprentices who are in their final year at the NYS. The three major trade areas include mechanical trades, motor vehicle mechanics, and motor vehicle electrical trades. Each class had an enrollment of about 20 students. Twenty-five subjects were selected to participate in the study using a stratified sampling technique.

Contact with the informal sector was made through the Federation of Jua Kali Associations. The federation had only recently been established in order to present a single lobby group for the informal sector in the country. The chairman of the Ziwani Jua Kali Association was contacted at the largest informal sector site in Nairobi to request assistance in setting up the interviews. In subsequent visits to Ziwani, it became clear that the chairman did not have an up-to-date list of apprentices, despite his promises to provide it. Instead, he was willing to invite apprentices for interviews whenever one was

not working at the time. Without records from which to select subjects, this pseudo-random approach to selecting apprentices for interviews represented a convenience sampling method. Twenty four apprentices were interviewed from the informal sector.

A total of 71 apprentices were interviewed during this study. These were 24 apprentices from the informal sector, 24 from the NYS, and 23 apprentices from the DIT. This sample size was estimated to result in a sampling error of plus or minus seven percent. To reduce the sampling error to plus or minus five percent would have required that the sample size be increased to at least 400. Due to the nature of the interview data gathering technique, associated costs, and time, the sample size of 71 was judged to be acceptable.

Instrumentation

Interviews were conducted as the primary data collection method. The choice of the interview method was based on inadequate mailing facilities for some of the respondents, the need to observe the work environment, and a desire for in-depth responses to improve the quality of the responses.

An interview guide was developed based on entrepreneurial competencies identified by Timmons (1989) and Ronstadt (1984). Timmons (1989) identified the most crucial entrepreneurial competencies based on interviews with successful entrepreneurs. According to Timmons, individuals wishing to go into entrepreneurial careers should either (a) have these competencies or (b) be aware of their weaknesses and how to overcome them. Ronstadt (1984) identified 12 entrepreneurial factors believed to be crucial for entrepreneurial success. In a study of college students, Ronstadt found that those who had strong entrepreneurial interests took more courses that included the entrepreneurial factors than those without an entrepreneurial interest. A higher percentage of these students ended up in entrepreneurial careers.

A combination of safeguards was used in this study to reduce the problems inherent in the interview technique. One safeguard was in the design of the interview guide. Multiple cues were used to enable the interviewer to (a) maintain as much consistency as possible with each interviewee and (b) control the length of each interview to avoid fatigue and waste of the respondent's time. Further, for each item on the interview guide, the interviewer was required to check one of three choices corresponding to interviewees' knowledge and skills.

This structured interview format provided a mechanism for standardizing the data to obtain generalizability and making comparisons between respondents. The format also helped to reduce the length of interview interaction.

The instrument was tested for validity among indigenous Kenyans living in the Champaign-Urbana area using an actual simulation of the interview situation to ensure that the instrument would retain its stability. The final testing of the instrument was conducted in Kenya with three individuals who had characteristics similar to the target population.

Procedures

The Government of Kenya requires all researchers in the country to obtain a research permit. This permit facilitated easy access to all research sites. In the case of the formal institutions, permission to access the training institutions also had to be requested through the Directorate of Industrial Training and National Youth Service.

Data collection. The formal apprentices were interviewed within the classrooms where their programs were conducted. The DIT apprentices were interviewed at the National Vocational Training Center on each working day from 4:00 p.m. to 6:30 p.m. as well as on Saturday and Sunday mornings (which were the non-class times available). Weekend scheduling of interviews was possible because all DIT apprentices are required by regulation to reside at the training center. Each subject was asked to select a convenient time to be interviewed. Over a period of two weeks, 23 out of 24 apprentices were interviewed. One apprentice failed to keep his interview appointment due to unavoidable personal circumstances. The NYS apprentices were interviewed at the NYS Engineering Craft Training Center in Ruaraka between 10:30 a.m. and 1:00 p.m. each day which coincided with practical sessions to minimize student loss of class time. Twenty-four out of 25 interviews were completed.

The informal apprentices were interviewed at their work site at the Ziwani Jua Kali site. It was not possible to set up specific times for interviews because the apprentices were only available for interviews when they had no work to do. Work in the informal sector occurred every day of the week including Sunday and often continued as late as 6:30 p.m. Attempting to arrange interviews averaging about two hours was difficult for the informal sector apprentices. Visits to the Ziwani site occurred at least three days a week for nearly three months during which 24 interviews with the apprentices were

completed. This number closely corresponded to those of the apprentices from DIT and NYS. General observations regarding the structure of the business premises, location of the business, the prevailing work environment, and interaction between the association officials who manage the facilities at the sites were also unobtrusively recorded.

Data analysis. Data were analyzed using simple descriptive statistics, including measures of central tendency, percentages, and frequencies. One-way analysis of variance (ANOVA) was used to test for significant differences in competency levels between the three groups of apprentices. Group means were calculated according to identified competency level of each apprentice (i.e., Competent = 1, Knowledge without competence = 2, Lacking knowledge and competence = 3). An alpha level of .05 was used for all tests of significance. Structured items, which could be represented as single number responses, were analyzed using means. Items that yielded frequency data were analyzed as percentages. Scaled items were also analyzed as frequencies and percentages. Pearson *r* correlations were used to determine the relationship between the apprentices' competency and future career aspirations. Responses to open-ended items were coded around common themes and phrases before being analyzed using frequencies and percentages.

Results

Research questions were developed to explore how entrepreneurial knowledge and skills are acquired by apprentices and how those skills differ across formal and informal apprenticeship programs. The findings are organized around each research question.

Research Question 1: How do the formal and informal apprenticeship training systems differ in their emphasis on entrepreneurial knowledge and skills?

This research question was designed to identify the entrepreneurial knowledge and skills acquired by apprentices and how they differed across the formal and informal apprenticeship training systems. The type of entrepreneurial knowledge and skills acquired by the apprentices during their training was organized into five sections: (a) Marketing Skills; (b) Operational and Technical Skills; (c) Financial Skills; (d) Administrative, Interpersonal, and Team Skills; and (e) Knowledge of Law Relevant to Self-Employment. For

each item, it was determined whether the apprentice had experience in the specific skill, had knowledge of the skills without any experience, or lacked knowledge of the skill. Table 1 shows the frequency distribution of the competency levels in all five skill areas for each group of apprentices.

Marketing skills. The marketing skills examined in the study are those related to the ability of apprentices to provide satisfactory services to customers. Analysis of the data using a one-way analysis of variance (ANOVA) revealed a significant difference in the competency level of the apprentices from the three groups, $F(68) = 24.36$, $p < .05$. The mean competency level of the apprentices in marketing skills was 1.6771 (Informal), 2.2857 (DIT), and 2.7813 (NYS). The results of a Tukey-HSD test revealed a significant difference between the competencies of the informal sector apprentices and the formal sector apprentices as well as between the DIT and NYS apprentices. In general, informal sector apprentices were more competent in marketing skills than the formal sector apprentices, while the DIT apprentices were more competent in marketing skills than the NYS apprentices.

The informal sector apprentices had a clear advantage over the formal sector apprentices in the acquisition of marketing skills. Comments by informal apprentices revealed the existence of cash incentives in their work environment. This factor seemed to encourage trainees to develop aggressive salesmanship skills. These apprentices were also in constant proximity to customers and were able to observe customer behavior as well as trainer-customer interactions. Because work units tended to be fairly small, apprentices were introduced to all facets of the job sooner than was the case in the formal sector. Opportunities to handle related tasks such as meeting with customers, negotiating sales, and handling customer complaints seemed to come more quickly in the informal sector. Apprentices from the formal sector described a more structured organization where work assignments were made through some hierarchical structure. The head of a department who needed work to be done would bring it to the attention of the apprentice's department head, who subsequently passed the work-order to the appropriate unit foreman, who in turn gave the order to an artisan. Apprentices were often far-removed from direct contact with customers. Complaints about their work were handled in the same hierarchical manner. A few of these respondents, particularly those from smaller organizations, reported that, as senior apprentices, they could be left in

Table 1
Frequency Distribution of Apprentices' Entrepreneurial Skills

	Apprentice Group	*n*	Competent in the Skill	Knowledge without Competence	Lacked Knowledge & Competence
Marketing Skill					
Able to determine customer needs & to develop products that meet those needs.	INF	24	11 (45.8%)	8 (33.3%)	5 (20.8%)
	DIT	23	5 (21.7%)	10 (47.8%)	7 (30.4%)
	NYS	24	0 (0%)	5 (20.8%)	19 (79.2%)
Able to identify, meet, & develop new customers.	INF	24	13 (54.2%)	7 (29.2%)	4 (6.7%)
	DIT	23	4 (17.4%)	3 (13.0%)	16 (69.6%)
	NYS	24	2 (8.3%)	1 (4.2%)	21 (87.5%)
Able to negotiate a sale with a customer.	INF	24	18 (75.0%)	2 (8.3%)	4 (16.7%)
	DIT	23	3 (13.0%)	5 (21.7%)	15 (65.2%)
	NYS	24	2 (8.3%)	0 (0%)	22 (91.7%)
Able to handle customer complaints.	INF	24	9 (37.5%)	8 (34.9%)	7 (30.4%)
	DIT	23	3 (13.0%)	14 (60.9%)	6 (26.1%)
	NYS	24	0 (0%)	7 (29.2%)	17 (70.8%)
Operation and Technical Skill					
Able to plan machine, manpower, & space requirement.	INF	24	2 (5.83%)	17 (70.8%)	5 (20.8%)
	DIT	23	1 (4.3%)	8 (34.8%)	14 (60.9%)
	NYS	24	0 (0%)	4 (16.7%)	20 (83.3%)
Able to determine the final cost of a product.	INF	24	14 (58.3%)	7 (29.2%)	3 (12.5%)
	DIT	23	2 (8.7%)	13 (56.5%)	8 (34.9%)
	NYS	24	1 (4.2%)	11 (45.8%)	12 (51.0%)
Able to inspect incoming, in-process, & finished materials.	INF	24	9 (37.5%)	13 (54.2%)	2 (8.3%)
	DIT	23	7 (30.4%)	7 (30.4%)	9 (39.1%)
	NYS	24	0 (0%)	4 (16.7%)	20 (83.3%)
Able to manage production process in order to meet customer expectations.	INF	24	14 (58.3%)	3 (12.5%)	7 (29.2%)
	DIT	23	10 (43.5%)	0 (0%)	13 (56.5%)
	NYS	24	5 (20.8%)	1 (4.2%)	18 (75%)
Able to relate quality with customer satisfaction, & overall long term firm image.	INF	24	10 (41.7%)	13 (54.2%)	1 (4.2%)
	DIT	23	4 (17.4%)	17 (73.9%)	2 (8.7%)
	NYS	24	0 (0%)	19 (79.2%)	5 (20.8%)
Able to determine the cost effect of keeping inventory of materials & finished goods.	INF	24	3 (12.5%)	6 (25.0%)	15 (64.3%)
	DIT	23	1 (4.3%)	7 (30.4%)	15 (65.2%)
	NYS	24	0 (0%)	6 (25.0%)	18 (75.0%)
Financial Skill					
Able to prepare a budget.	INF	24	1 (4.2%)	14 (58.3%)	9 (37.5%)
	DIT	23	1 (4.3%)	9 (39.1%)	13 (56.5%)
	NYS	24	0 (0%)	19 (79.2%)	5 (20.3%)

	Apprentice Group	n	Competent in the Skill	Knowledge without Competence	Lacked Knowledge & Competence
Able to forecast funds need (cash flow) for the business.	INF	24	0 (0%)	15 (62.5%)	9 (37.5%)
	DIT	23	2 (8.7%)	8 (34.8%)	13 (56.5%)
	NYS	24	0 (0%)	5 (20.8%)	19 (79.2%)
Familiar with financial statements.	INF	24	0 (0%)	2 (8.3%)	22 (91.7%)
	DIT	23	0 (0%)	3 (13%)	20 (87%)
	NYS	24	0 (0%)	1 (4.2%)	23 (95.8%)
Familiar with sources of short and long term financing.	INF	24	0 (0%)	7 (29.2%)	44 (62.9%)
	DIT	23	0 (0%)	9 (39.1%)	14 (60.9%)
	NYS	24	0 (0%)	10 (41.7%)	14 (58.3%)
Able to prepare a business plan.	INF	24	0 (0%)	1 (4.2%)	23 (95.8%)
	DIT	23	1 (4.3%)	2 (8.7%)	20 (87%)
	NYS	24	0 (0%)	5 (20.8%)	19 (79.2%)
Able to maintain bookkeeping and accounting records.	INF	24	1 (4.2%)	3 (12.5%)	20 (83.3%)
	DIT	23	1 (4.3%)	1 (4.3)	21 (91.3%)
	NYS	24	1 (4.2%)	3 (12.5%)	20 (83.3%)
Administrative, Interpersonal, and Team Skill					
Able to monitor & supervise the actions of others.	INF	24	16 (66.7%)	3 (12.5%)	5 (20.3%)
	DIT	23	8 (34.8%)	3 (13%)	12 (52.2%)
	NYS	24	8 (33.3%)	0 (0%)	16 (66.7%)
Able to confront differences openly & deal with them until resolution is obtained.	INF	24	9 (37.5%)	3 (12.5%)	12 (50%)
	DIT	23	5 (21.7%)	11 (47.8%)	7 (30.4%)
	NYS	24	8 (33.3%)	11 (45.8%)	5 (20.8%)
Able to work well with others pursuing common goals.	INF	24	9 (37.5%)	8 (33.3%)	7 (29.2%)
	DIT	23	6 (26.1%)	9 (39.1%)	8 (34.8%)
	NYS	24	6 (25%)	8 (33.3%)	10 (41.7%)
Able to measure work quality of peers or subordinates.	INF	24	15 (62.5%)	4 (16.7%)	5 (20.8%)
	DIT	23	10 (43.5%)	6 (26.1%)	7 (30.4%)
	NYS	24	5 (20.8%)	6 (25%)	13 (54.2%)
Law Relevant to Self-Employment					
Familiar with business legality and licensing regulations.	INF	24	0 (0%)	15 (62.5%)	9 (37.5%)
	DIT	23	0 (0%)	15 (65.2%)	8 (34.9%)
	NYS	24	0 (0%)	19 (79.2%)	5 (20.8%)
Familiar with contract procedures & requirements.	INF	24	2 (8.3%)	7 (29.2%)	15 (62.5%)
	DIT	23	1 (4.3%)	8 (34.8%)	14 (60.9%)
	NYS	24	5 (20.8%)	12 (50%)	7 (29.2%)
Familiar with tax regulations & pay-as-you-earn for employees.	INF	24	0 (0%)	3 (12.5%)	21 (87.5%)
	DIT	23	0 (0%)	15 (62.5%)	8 (34.8%)
	NYS	24	0 (0%)	3 (12.5%)	21 (87.5%)

INF = Informal Sector
DIT = Directorate of Industrial Training
NYS = National Youth Service

charge of work. For example, during shift work, they were given responsibility for handling customer needs and complaints.

The informal sector apprentices explained that in addition to their daily allowance (based upon daily earnings and their level of experience), they also received a bonus when they brought in a customer. An apprentice who had worked for only seven months and who normally received 20 Shillings per day (65 K Shillings = $1.00), explained that he "was paid 70 Shillings out of 250 Shillings from the job" after he brought in his first customer. This bonus was more than three times his regular daily allowance and may have motivated him to more aggressively pursue new customers. No universal formula was used for determining the size of bonuses paid to apprentices who brought in customers. The practice of providing cash rewards seemed to work as a powerful motivator for the informal apprentices to attract more customers. This aggressive salesmanship was quite evident when one visited the site. Apprentices rushed to meet visitors with offers to help solve their problems.

Operational and technical skills. Operational and technical skills covered competencies that had to do with planning work, costing, managing production, and conducting inventory control. The skills of apprentices in this area were not uniform across the groups. Analysis of data using a one-way ANOVA showed a significant difference in the competency level of the apprentices across the three groups, $F(67) = 18.51, p < .05$. The mean competency level of the apprentices in operational and technical skills was 1.8542 (Informal), 2.2750 (DIT), and 2.5972 (NYS). A Tukey-HSD test revealed significant differences between the competencies of the informal sector apprentices and the formal sector apprentices as well as between the DIT and NYS apprentices.

A small number of apprentices (5.8%) reported having had an opportunity to participate in planning machine, manpower, and space requirements. In these cases, however, the role of the apprentices was merely at the installation phase and not the actual planning. One DIT apprentice explained that he had been involved in four plant expansion projects in his tea company but that his role had been confined to the implementation stage of new equipment. Most formal apprentices explained that planning activities were the domain of supervisors and engineers. Apprentices were asked a hypothetical question (i.e., list the critical things required to start a small workshop in their trade) to determine whether they had the desired knowledge, in spite of the lack of experience. More informal

sector apprentices were able to provide correct answers to this hypothetical problem (70.8%) than the apprentices from the DIT (30.4%) or the NYS (16.7%).

The ability to cost a job is an important skill for the self-employed. Over half (58.3%) of the informal sector apprentices indicated that they had developed the competency for determining the cost of jobs, while few of the DIT (8.7%) or NYS (4.2%) had done so. The majority of the informal sector apprentices who had experience in costing explained that they had observed trainers perform the costing process several times. As a result, they were able to provide costing information for customers in the absence of the trainer. Apprentices in the formal sector reported that determining the cost of a job was the responsibility of supervisors and accountants and so was not done in their presence. One apprentice indicated that he had gained extensive experience in determining final job costs by trial-and-error when he fabricated products for sale during his free time.

The ability to manage production or service processes to meet customer expectations is an important skill that all apprentices should acquire. Several apprentices from the DIT group (43.5%) reported that they had been responsible for production processes. Most said that such opportunities occurred (a) during annual maintenance shut-downs (when large numbers of casual workers were hired), (b) during shift work, or (c) when the foremen were on leave. On average, DIT apprentices were responsible for the production process after completing at least one year in their organizations. Their responsibilities typically involved ensuring work quality, obtaining materials from stores, and completing production reports. In the informal sector, 58.3% of the apprentices reported that they had been responsible for production or service processes. The most senior or knowledgeable among the apprentices often took charge of production when their trainer was away. Being responsible for work activities involved (a) making provisions for required materials, (b) ensuring that the quality of work was satisfactory, (c) negotiating with customers, (d) receiving cash for work done, and (e) hiring and paying temporary workers when jobs required extra help.

Financial skills. This section of the interview focused on six skills to determine if the apprentices were involved in the financial activities of their firms (see Table 1). The results indicate that the apprentices had little or no knowledge in this area. The one-way ANOVA revealed no significant difference between the three groups,

$F(67) = .06$, $p > .05$. Even the informal sector apprentices, who appeared to have been at an advantage in acquiring other entrepreneurial skills, did not display any more competence in this area than the formal sector apprentices. Comments from formal sector apprentices suggested that this area of work was performed by accounting departments within their organizations. In the informal sector, comments from the apprentices indicated that their masters did not keep financial records at work.

Administrative, interpersonal, and team skills. This section of the interview covered skills related to supervising the activities of others, working with others, and the ability to resolve conflicts when they arose in the work place. There was no significant difference in the overall competency levels of the three groups of apprentices, $F(65) = 2.12$, $p > .05$. However, as shown in Table 1, apprentices in each of the three groups had been exposed to varying degrees of administrative, interpersonal, and team skills.

The ability to monitor and supervise the action of others is an important skill needed to manage one's own business and also to gain increased responsibility in paid employment. To assess the apprentices' monitoring and supervision competencies, they were asked if they had supervised the work of others at their firm, the frequency of such appointments, and their attitude towards supervisory roles. Thirty-three apprentices were judged to have acquired the competency of supervising the work of others (47.8%), 31 were judged as lacking both hands-on competency and knowledge (44.9%), and five possessed knowledge only without any experience (7.2%).

As noted in Table 1, twice as many informal sector apprentices were competent in supervision than those in the formal sector. Based on observations, a typical working business unit in the informal sector consisted of the trainer (or master), one or two journeymen, and one or two trainees. The relatively small size of the unit appears to have enabled apprentices to attain positions of supervision more rapidly than apprentices working in the formal sector. About half of the apprentices in the informal sector had been exposed to supervisory experience, which provided them with the opportunity to be "boss" and to earn more money. The other half reported that they did not like supervisory roles since they tended to bring them into conflict with others in their work unit.

Apprentices from the DIT described three scenarios in which they would be appointed to a supervisory role; (a) when their foremen were absent, (b) when their industries closed down for

annual maintenance and temporary workers were hired, and (c) during shift duty where regular supervisors were exempted. Apprentices who had been exposed to supervisory roles reported that they felt fortunate to have been selected over others and they enjoyed the freedom to make decisions regarding matters of work. They also appreciated the opportunity to experience different kinds of jobs as well as the opportunity to assist others. Among the NYS apprentices who had been exposed to supervisory roles (33.3%), two scenarios brought about the opportunity. First, the most senior trainees were appointed to short-term supervisory roles during the absence of workshop inspectors. Second, apprentices ascended to supervisory roles through promotions, usually during the early period of training. Half of those who had been exposed to hands-on supervisory roles stated that they enjoyed supervisory roles which had generated certain perks (e.g., higher allowance and fewer menial tasks). At the same time, they felt closer to the decision-makers in the NYS and hoped that when the time came to find post-training employment, experience in supervision would provide them with an advantage over other graduates.

Conflicts among individuals in the work place are inevitable. Therefore, developing the ability to confront differences is an important survival skill. Apprentices were asked whether they had been exposed to any conflicts at their place of work and how they resolved these conflicts. If apprentices indicated a lack of direct exposure to this type of conflict, they were asked how they would respond to a hypothetical work conflict situation. Among the DIT apprentices, 21.7% reported having faced some differences with others in the work place. Usually these conflicts were with individuals with more experience than themselves. Nearly all of these DIT apprentices explained that conflict emerged from what they termed as "envy" on the part of the experienced workers who lacked the minimum educational background necessary to secure formal apprenticeship training. Avoiding or ignoring the problem appeared to be a common coping strategy for many of these apprentices. A third of the NYS respondents reported having to deal with differences at work (33.3%). One common strategy for resolving problems was described by an apprentice; "Talk to the person with whom you have a conflict, allow the problem to simmer, and then revisit the discussion." Requesting third party intervention of a peer was the next most common approach. Unresolved problems were reported to a higher member of the NYS hierarchy. In the informal sector, the most common

approach was discussing the issue with the other party in the conflict. If a solution was not found, third party intervention was sought from masters and, in their absence, with other "elders" within the work site who were asked to assist in resolving issues.

Knowledge of law relevant to self-employment. Knowledge of basic legal requirements for establishing and running a small business is important for prospective entrepreneurs. As anticipated, all of the apprentices were weak in this area (see Table 1). An ANOVA found no significant difference between the competence level of the three apprentice groups, $F(69) = 2.42, p > .05$. This result showed that none of the apprentices had any experience in complying with the legal requirements for establishing a business.

Research Question 2: How are entrepreneurial knowledge and skills acquired by apprentices?

This research question sought to determine what methods were used by apprentices to acquire specific entrepreneurial skills. The most common methods included: (a) specific, on-the-job instruction provided to apprentices by skilled workers; (b) observation of skilled workers as they worked, negotiated with customers, and mediated disputes; (c) instruction received at vocational colleges or previously gained in secondary school; and (d) operation of small businesses during or prior to starting their apprenticeship training (see Table 2).

When skill acquisition was examined in the context of each of the apprenticeship groups across all 23 entrepreneurial skills examined in this study, informal sector apprentices were found to rely most heavily on the observation method for skill acquisition. In 15 of the 23 skill areas, the primary skill acquisition method was observation. Only one skill, "Preparing Budgets" was learned through on-the-job instruction. Observation seemed to be a powerful learning tool for the informal apprentices. For example, one apprentice, after observing an incident of fraud committed against a customer, concluded that honest dealings with customers was important. Another apprentice indicated what he watched for as his trainer dealt with customers. "I watch my trainer, his voice, gestures, and expressions." Another apprentice explained the need to be discreet when observing a financial transaction between a customer and his trainer because trainers usually "don't want trainees to know how much they are taking in."

For DIT apprentices, on-the-job instruction and observation were the primary methods for acquiring entrepreneurial skills. DIT

Table 2
Methods of Entrepreneurial Skill Acquisition for Competent Apprentices

	Competent Apprentices*	On-the-job Instruction	Observation	Instruction at College	Business Ownership
Marketing Skill	Informal (51)	3	48	0	0
	DIT (15)	5	6	1	3
	NYS (4)	0	2	2	0
Operation & Technical Skill	Informal (52)	11	41	0	0
	DIT (25)	16	4	0	5
	NYS (6)	3	3	0	0
Financial Skill	Informal (2)	1	1	0	0
	DIT (5)	0	0	1	4
	NYS (1)	0	0	0	1
Administrative, Interpersonal, & Team Skill	Informal (49)	6	43	0	0
	DIT (29)	12	17	0	0
	NYS (27)	14	13	0	0
Law Relevant to Self-Employment	Informal (2)	1	1	0	0
	DIT (1)	0	1	0	0
	NYS (0)	0	0	0	5

Note: * Number in parentheses represents total number of competent apprentices across all competencies within each category. See Table 1 for breakdown of specific competencies.

apprentices had fewer opportunities to observe business transactions between customers and their superiors than did the informal sector apprentices. The DIT work environments were usually strictly demarcated according to functional lines. Most entrepreneurial activities were conducted away from where the DIT apprentices were working. Even though DIT apprentices attended vocational college as part of their apprenticeship training, none attributed their entrepreneurial skills to formal training. The one apprentice who indicated that he acquired his entrepreneurial skills through formal training, pointed instead to pre-apprenticeship skills obtained in high school.

Of the three groups in this study, the NYS apprentices had the fewest opportunities for acquiring entrepreneurial skills. Although observation was the primary method used to acquire skills (followed closely by on-the-job instruction), the NYS work environment provided few opportunities to observe business transactions. Further,

the movements of the apprentices were strictly controlled and they had no opportunity to work outside of NYS, even on weekends.

Discussion

This study sought to determine the efficacy of apprenticeship training systems in Kenya for preparing entrepreneurs for self-employment. The impact of the work environment on the apprenticeship training process was shown to influence the knowledge and skills acquired by the three apprentice groups. In general, apprentices from the informal sector group gained more entrepreneurial knowledge and skills than the formal sector groups. The NYS environment appeared least able to provide relevant entrepreneurial knowledge and skills. Most of the apprentices from NYS appeared to have acquired little or no practical entrepreneurial skills during their apprenticeship period. In general, no group showed any advantage over the others in knowledge possessed in skills related to (a) the financial aspects of the business, (b) knowledge of the basic legal requirements for establishing a business, or (c) familiarity with income tax regulations.

Informal Sector Apprentices

The informal sector apprentices had an advantage over the other two apprenticeship groups in 15 of the 23 entrepreneurial competencies. The informal sector appears to provide more opportunity to acquire business-related skills than the formal sector. The conditions that seem to help the apprentices acquire the skills include the small size of the enterprises, intense competition, the informality of doing business, and direct financial rewards for hard work.

The small size of the enterprises seemed to be a factor in skill acquisition within the informal sector. According to the chairman of the Jua Kali Association at the Ziwani informal sector site, the Association recommends that artisans recruit only a few apprentices to ensure that adequate training could be provided. In such small enterprises, the bureaucratic structures that exist in larger formal sector organizations are non-existent. In addition, most activities are conducted on an ad hoc or informal basis. Apprentices in these settings are constantly in close proximity with master artisans and are able to observe all the operations of the business. Also, apprentices in these micro-enterprises are able to assume responsibility sooner since the master artisan has fewer people in the organizational hierarchy to delegate to.

Competition appeared to be fierce in the informal sector. According to estimates obtained from the on-site Jua Kali Association office, 4,000 artisans were working side-by-side in 11 of the trades represented in the area. Also, artisans in the same trade routinely set up their work places next to each other. For example, all activities related to soldering were in one location, welding and metal fabrication grouped together in another location, and exhaust fabrication in another location. Consequently, artisans were always aware of the volume of their neighbors' business activities. When customers approached the site, they would immediately be surrounded by numerous journeymen and apprentices attempting to get their business. Attracting customers was so crucial that each artisan had developed some method of rewarding journeymen and apprentices who succeeded in getting customers. This technique seemed to act as a powerful incentive to develop aggressiveness and salesmanship among the apprentices. Bringing in a customer was only half the job. Competition dictated that customers receive fair pricing, good care of their property, and courteous treatment to ensure repeat business. Most apprentices in the informal sector already knew the importance of these factors based on experience within their units or through observing incidents in other units.

Within the informal sector, skill acquisition seemed to be directly related to the length of apprentices' training and their daily allowances. Earlier studies support the observation of flexible length of training within the informal sector (King, 1977; Ndua & Ng'ethe, 1984). Factors that seemed to have a bearing on length of apprenticeship training included (a) the diversity and volume of work available to an artisan, (b) the aptitude and attitude of the apprentice, and (c) the training style of the artisan. Attitude was the easiest factor for apprentices to emulate. Apprentices could excel if they worked hard, had a keen sense of observation, and were willing to experiment. Such apprentices learned quickly, were given work responsibility sooner, and completed apprenticeship training more quickly. Monetary incentives were used effectively in the informal sector to motivate apprentices to rapidly seek and gain skill expertise. Those who learned quickly and demonstrated their ability to handle tasks tended to command higher daily allowances. According to Ndua & Ng'ethe (1984), apprentices re-negotiated their allowances as they became more skilled. The desire for a negotiating advantage might have encouraged apprentices to become more aggressive in developing skill expertise in order to negotiate a higher allowance from their masters.

DIT Apprentices

Even though both groups of formal apprentices had less entrepreneurial experience than the informal group, DIT apprentices generally gained more entrepreneurial skills than did the NYS apprentices. According to the interviews, the pattern of in-plant training for DIT apprentices involved being paired with a skilled artisan for the duration of their training. The senior artisan took responsibility for the work of the pair. Therefore, apprentices acquired few skills outside of the technical aspects of their assignment. Some of the apprentices reported having been assigned shift duties, where they were responsible for some section of the manufacturing plant. In these assignments, the apprentices learned how to prepare shift reports and, with additional experience, learned how to supervise other workers. DIT apprentices also reported being given supervision responsibilities over unskilled casual workers during annual plant maintenance shut-downs. Outside of their technical departments, DIT apprentices had few opportunities to acquire entrepreneurial skills within their organizations because other departments were responsible for tasks such as customer relations, pricing products, budgeting, and inspecting incoming materials.

Some apprentices displayed entrepreneurial knowledge and skills in spite of the relatively few opportunities to acquire them during their regular apprenticeship training. These apprentices had previously operated or were currently owners of their own businesses. Four of the 23 DIT apprentices explained that they operated their own businesses and maximized the use of their free time (e.g., evenings, weekends, and vacations) to work in their businesses. The DIT apprentices who were already involved in some entrepreneurial activities while serving their apprenticeship training were more likely to view themselves as being self-employed in the future.

NYS Apprentices

Among the three groups, the NYS apprentices' training environment was the least conducive to imparting entrepreneurial skills. NYS apprentices lacked knowledge and skills in most of the 23 competencies covered by the interview. The NYS produces technical apprentices who have virtually no skills outside of their trade disciplines. Due to lack of employment opportunities, however, some of the graduating apprentices may be forced to become self-employed. The results of this study indicate that NYS apprentices are aware of the unemployment situation in the country and 57.7%

indicated that they expected to encounter difficulties finding paid employment. Over half indicated an interest in being self-employed; however, a lack of entrepreneurial skills puts them at a severe disadvantage when compared with other self-employed artisans, especially those who completed apprenticeship training in the informal sector. Providing entrepreneurship education to NYS trainees concurrently with technical training may make an important contribution to their ability to become self-employed.

Recommendations for Apprenticeship Training

The results of this exploratory study indicate that, within an appropriate environment, apprenticeship training can impart entrepreneurial knowledge and skills and subsequently can facilitate smooth entry into self-employment. The informal sector is estimated to provide the largest amount of training in Kenya (ILO, 1988, Tomecko, 1991). Many of these apprentices will eventually become self-employed artisans, thus creating employment for themselves and others. With some improvements in the training process and the enabling environment, the informal sector could have a strong impact on future entrepreneurs in Kenya. The formal apprenticeship training programs provided by the DIT and NYS could also make important contributions to the development of entrepreneurs; however, as presently constituted, few graduates of this system are prepared for self-employment.

The quality of training received by apprentices is directly related to the enabling environment in which the training is conducted. Apprenticeship programs need to provide entrepreneurship training in addition to the technical training. The entrepreneurship curricula that has been prepared for the technical training institutes could be used to train technical teachers to provide instruction in entrepreneurship. Providing relevant entrepreneurial experience for the DIT trainees could present problems for sponsoring companies who may not be interested in placing these trainees in departments where they could obtain these experiences. However, the results of this study indicate that trainees are willing to start their own business while in training. These trainees showed evidence of higher entrepreneurial skills than those who did not own businesses. If entrepreneurship education is provided to apprentices, more trainees might start their own business.

The NYS needs to introduce entrepreneurship education as well as internships in a more commercial setting in order to provide post-

employment opportunities or self-employment in the informal sector. The present NYS training process appears to be working on the assumption that graduates from their apprenticeship system will find employment in the formal sector where they can gain relevant work experience. Interviews with these trainees revealed that most did not expect to find paid employment in the formal sector. Also, most felt that they needed more relevant work experience to be able to become self-employed. At the present time, the NYS is providing entrepreneurship training to its former trainees who have had some work experience. The NYS might also provide entrepreneurship education to all of its graduates before discharging them into the work place. These knowledge and skills would enable those trainees who do not find paid employment, or those wishing to enter into self-employment, to be better informed. According to the Principal of the NYS Engineering Craft Training School, plans are underway to introduce the national craft syllabus designed by the Kenya Institute of Education. This curriculum already incorporates an entrepreneurship component and reinforces this recommendation.

The need for relevant work experience for apprentices is crucial. The workplace pressures brought about by competition in the marketplace found in the informal sector is lacking in the NYS program. To acquire more entrepreneurship skills, the NYS needs to provide internships for its apprentices within the informal sector instead of the current practice of placing them within NYS workshops. Evidence from this study indicated that trainees can acquire a variety of technical and entrepreneurship skills in the informal sector in a relatively short period of time. Since the NYS trainees would have already acquired some technical skills in their institutions, the informal sector would provide them with the opportunity to put their skills to use in solving real problems within time constraints as well as an opportunity to observe business activities in authentic workplace settings.

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