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Analyzing Innovative Features in Higher Education in Israel

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Abstract: Though starting late, Israeli higher education has made fruitful achievements, owing much to the innovative thinking ideology in education. This innovative spirit is reflected in the traditional concept of Jewish education, high investments from government and society, the problem-driven features of the education process, and a comprehensive focus on the industrial transformation of research products. In terms of cultivating innovative talents, sound scientific and technological plans, effective guiding mechanisms, unique research learning modes, organic integration of innovation and entrepreneurship education, and innovative measures of military education contribute to an excellent environment and a platform for cultivating students' scientific research and entrepreneurial abilities. The rich content of entrepreneurship and professional education, and the driving effect of the national military service system reflect the innovative features of higher education in Israel and offer positive reference value for the reform and development of innovation and entrepreneurship education in China.

Keywords: Israel, higher education, innovative features

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Israel's higher education dated back to the Jewish community in Sicily, Italy in 1466, where the desire for a modern university was first born (Troen, 1992). It was not until the creation of the Hebrew University of Jerusalem and the Israel Institute of Technology in the 1920s that a truly modern university was proclaimed. Since then, Israel has established seven universities, all of which have basically followed the educational model of

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German meritocracy, emphasizing that universities are research institutes and should integrate education with research (Rozenblit, 1993). Even today, when education has become popular in Israel, universities have retained their focus on scientific research after a modest expansion.

The responsibility for expanding undergraduate education lies with a number of community colleges, normal colleges and open universities. There are three main reasons for this phenomenon. One is that the main founders of Israeli universities are Jewish. The Jewish people always follow the culture and education tradition of their religious classic *Talmud* and pay attention to learning and innovation. The second is that the German Humboldtian model is recognized in the process of setting up a university, and the representatives of the cultural Zionism, Ahad Ha'am and Chaim Weizmann, believed that "A university should be a research institute rather than a vocational training institute" (Hao, 2019, p. 11). Third, the university sponsors also require universities to pay attention to scientific research. The Rothschilds of France, for example, insisted that a university be set up as a research institution and claimed they would not fund normal universities. Therefore, Israel's higher education started late, but has achieved fruitful results. In only a few decades, Israel has transformed itself from a "small agricultural country" in 1948 to the most industrialized and economically developed country in the Middle East, ranking among top developed countries, and creating a miracle of economic development (Zhang, 2015). The success of higher education in Israel has not only cultivated a large number of scientific elites in science and technology, but also provided a practical reference for the reform and innovation of higher education in China with its unique education concept, education strategy and teaching content.

Innovation Concepts in Education

The success of Israel's higher education owes much to the success of its traditional Jewish education, especially *The Hebrew Bible* and *Talmud*. In the 4th century, the archbishop of Constantinople, John Chrysostom, put all holy books under the name of "Bible." Since then, in order to maintain their own unique religion and culture, the Jewish people read the *Bible* (Old Testament) through educating children to continue the lifeblood of the Jewish people. The *Talmud* currently has over 2.5 million words in 12,000 pages across 20 volumes (Le, 2009, p. 50). It is the essence of the wisdom of the Jewish people. In Israel, one of the core elements of the national education is religious education. Religious education "requires all man to follow the same path to the wisdom of the Lord" (Yao & Chen, 2013, p. 227), and testimonies refer mainly to the *Bible* and the *Talmud*. For thousands of years, the *Bible* and the *Talmud* were the source of persistent Jewish wisdom, guiding Jews to get out of suffering again and again, and gradually forming the Jewish world view that became the living standard and moral culture that underlies Jewish culture. The studies of the *Bible* and the stories of the *Talmud* reveal that an important feature of the Jewish education concept is to cultivate children's critical and innovative thinking, (Xiong, 2014, p. 126). Jews believe that education is not only to teach children knowledge, but also to cultivate

their ability to create the future, which means the ability to innovate. The Christian tradition of education, represented by Socrates, holds that knowledge is to be discovered, and education is the proper intellectual discipline. Different from this, Jews believe that knowledge is produced, and that learning should be based on thinking and driven by practice (Block, 2011, p. 24), instead of being a pedant who only knows knowledge but does not know how to use it. It was this spirit of creating the future that restored the Jewish nation. That made Israel, a small country of about 9.2 million people, among the world's leading technology powers. The innovative nature of education in Israel is mainly embodied in the following four aspects.

Firstly, the origin of Jewish education embodies the spirit of innovation. In 586 B.C., Nebuchadnezzar II of the Neo-Babylonian Empire occupied Jerusalem. Thousands of Jews became "Babylonians," including priests, nobles, artisans, and even members of the royal family. The collapse of the Jewish kingdom and the displacement of the Jewish people brought a religious and cultural crisis to the Jewish people. It was also "in such extraordinary times that Jews began to remember the teachings of the prophets" (Zhang, 1998, p. 109). Holy sites, temples and shrines no longer existed, and religious leaders persevered in maintaining the national traditions in order to reunite their fellow citizens under the banner of the Jewish religion. In addition to the compilation of the words of the prophets, synagogues emerged. People, no matter rich or poor, could meet in the synagogues, worshiping and listening to the sermon regardless of time, place, or rank. The adaptation from temple sacrifice to synagogue recitation was the practice of Jewish religious classics. It was this innovative adaptation that helped the Jewish people maintain their religious integrity and cultural inheritance during their two-thousand-year migration and exile. In the 3rd century B.C., at the request of the public, primary schools were opened in the synagogues, thus creating an era of Jewish education. Flexibility, or innovation, played an important role in the subsequent cultural struggles against the onslaught of Greek civilization and the rule of the Roman Empire. Israel's greatest sage, Rabban Gamaliel, eventually established the Jewish education model for posterity by hosting colleges, training teachers and compiling Mishnah. This model was later documented and demonstrated in the *Talmud*. The development of Jewish education is characterized with the development of family education and religious education, drawing on the Western education model, and ensuring the survival and inheritance of its people by maintaining Jewish spiritual values. Education, which is based on the special reality of national destiny, has embodied the spirit and thinking mode of innovation from the very beginning.

Secondly, the high investments in education in Israel emphasize scientific research and innovation. Since the founding of Israel, education has always been regarded as the most effective investment in the future of the country and the fundamental guarantee of national and ethnic development. Prime Minister of Israel Netanyahu commented that Israel had the harvest of unprecedented investments and efforts in the university of science and technology, and that the country would continue to strive to build itself into a high-tech power. They were investing 7 billion shekels (\$2 billion) in the cutting-edge projects of universities and the Israeli government

continued to invest heavily from preschool education to higher education (Xue, 2013).

Thirdly, Israeli higher education's issue-driven features promote innovation education. Israeli universities not only undertake the task of personnel training, but also the task of basic research. One of the characteristics of its scientific research is to explore the frontier of science and technology from the perspective of its own problems. For example, Israel is short of natural resources, especially water resources. Since its founding, the protection and development of water resources have been the top priority. Therefore, it promotes research on water-saving agriculture, desert governance, solar energy, software development and other related fields. Also, Israel has developed the world's most powerful military technology for national security. The implementation time of Israel's compulsory military service is after graduation from high school. Through two years of service, Israeli college students accumulate considerable practical experience when they are enrolled in colleges and universities, and they can often put forward very practical problems for study and research. In addition, there is a kind of "computer service" in Israel, in which the chosen ones must do military service for one more year to acquire advanced practical computer knowledge. This is an important reason why Israel is called the "New Silicon Valley."

Fourthly, the industrial transformation strategy of Israeli scientific and technological achievements has stimulated innovation practice. In Israeli universities, the results of scientific research can be quickly transferred to industrial development. This is good for the cooperation between technology companies and universities. The company is fully responsible for the patent application, technology transfer and external technical services of the university's scientific research results, and it also seeks partners in the industry sectors for the university's research projects, who introduce research funds and venture capital. The company operates independently and accounts independently, and its profits are distributed among the company, the university, and scientific research personnel. The advantage of this mode is obvious. It saves the university researchers from spending time and taking investment risks in the transformation of scientific and technological achievements to industry. It also brings timely material rewards to the university researchers. For universities, this practice can effectively mobilize the initiative of researchers and combine scientific research with teaching practices, which not only promotes the progress of scientific research, but also improves the quality of teaching. In particular, it provides real practice opportunities for cultivating students' abilities in innovation and entrepreneurship. The establishment of university-technology-transfer-company has brought benefits to students, teachers, universities, industry, technology companies and researchers, as well as more tax revenue for the country and more wealth for social and economic development. Therefore, such measures as technology transfers, technology services and joint-stock systems of cooperation have promoted the improvement of scientific research in Israeli universities and brought the transfer of scientific research and achievements into a positive cycle of mutual promotion.

Education Strategies for Innovative Talent Cultivation

Israel regards education as the wealth of society and the key to creating the future (LeVi & Ragonis, 2015). Relying on innovative talent cultivation to stimulate national innovation vitality, it has formed a unique innovative talent cultivation strategy and education system and mechanism. As a survival skill, innovative thinking is not only reflected in family education, but also integrated into the daily activities of university teaching as an education goal. Education strategy is embodied in the following aspects.

Firstly, a core content of the Israeli innovative talent training system is to improve the scientific and technological plan, form an effective guiding mechanism, promote close cooperation among industry, universities and research, and improve the research and development level of society (Zhang & Zhang, 2011). To promote innovation in Israel, the government, schools, enterprises and research institutions work together to build a platform for the cultivation of innovative talents. The specific measures include: First, Implementing the chief scientist responsibility system, helping society and enterprises to carry out commercial research and development on behalf of the government, promoting the development of new, high technologies and providing risk funding for scientific and technological personnel to realize the transformation from innovation achievements to product industrialization. Second, Establishing the chief scientist forum. Chaired by the Minister of Science and Technology, chief forum scientists are appointed to the various government departments. The main responsibility of forum is to explore major measures to improve the national innovation system, discuss major issues of science and technology innovation policies, prevent each department from isolation, overcome possible defects caused by multi-supervised management, and avoid the duplication or omission of science and technology projects. Third, Setting up numerous research institutes and R&D centers. Some function as government agencies, managing national research on innovative industrial products and applied technologies, while also serving as liaison agencies for Israeli participation in the Eureka Project, which is a high technology development plan proposed by 18 countries of Western Europe. The other part of the centers coming from enterprises and local R&D centers, together with the seven research universities, National Professional Academy of Agricultural Sciences, national research institutions, hospitals, non-profit organizations fund by the government for innovation, and risk investment institutions, constitute the active main body of the Israeli national innovation system. These agencies and institutions coordinate their research and developments, from laboratory to market, with the technology transfer companies to transform scientific research achievements into industry products. This kind of all-around scientific research training, experiment and transformation provide the students' innovation practice with efficiency and guarantee.

Secondly, research-based learning is advocated in higher education in Israel. In the eyes of Israelis, knowledge is not static, and many questions are posed without right answers. The core of research-based learning is to develop students' ability to find problems and infer solutions from

them. “What knowledge is most valuable?” Herbert Spencer raised the issue in 1860. The Western society, represented by the US, established education in accordance with a trading system, expecting every student to spend time, effort and/or money in exchange for their education. In this case, knowledge is viewed as an exchange quotient.

Education has evolved as a tool for social stratification. But in Israeli higher education, where Jewish education is the main feature, teachers do not directly tell students the answers to the questions. Knowledge is acquired by students themselves in scientific experiments. Therefore, research-based learning is not simply an exchange of knowledge, but a verification of knowledge through the development of research activities. During research, new problems arise, and new methods are explored. In the same way, not only is the process of knowledge acquisition dynamic, but knowledge itself is also constantly updated. As an education strategy, research-based learning teaches innovative thinking. Students trained by research-based learning are constantly influenced by research activities and naturally developing the habit of innovative thinking. The skills and methods learned through research are also the basic preparation for carrying out future scientific and technological innovation practices independently.

Thirdly, another initiative of Israeli innovative talent cultivation is to develop special innovative education courses and integrate entrepreneurship education into the innovation cultivation system, so that the course content is rich and comprehensive. Taking the University of Bahia as an example. The international IMBA program, a dynamic education practical program, integrates multiple academic elements including internship, special skills training, imitating “entrepreneurial” economics, and informal courses. The program takes global management as its academic core. In addition to basic knowledge courses such as finance, micro/macro-economics and mathematics, it also offers courses such as “cross-cultural negotiation,” “international business policies” and “business management under the global competitive environment.” The course also offers English courses including communications and rhetoric. Students will attend a series of lectures by Israeli business elites and visit “entrepreneurial” enterprises, including financial institutions and nanotechnology-driven solar energy enterprises. During the study period, students are required to do internships in startups. In addition to the formal studies and sightseeing there is a constant focus on special “informal education activities” in the IMBA program. Students from all over the world, including North America, Europe, Africa, Australia and Asia can come together, study together, communicate and progress together in a relaxed and enjoyable learning environment, both in class and after class.

For the Israel Institute of Technology, innovation and entrepreneurship curriculum materials reflect the characteristics of accurate supply, practical teaching focused on the integration of knowledge acquisition with real experience, external resources to assist the whole process of innovation and entrepreneurship education, and the application of pragmatic values in innovation and entrepreneurship education (Zhou, 2019). At the micro level, Israel Institute of Technology has integrated an appropriate entrepreneurship education philosophy with a basic system with

continuous research and development, and the constant improvement of the entrepreneurship education curriculum as well as the acquisition and retention of a highly professional faculty. At the meso level, it vigorously supports and promotes the improvement of entrepreneurship education organizations. At the macro level it strengthens the cooperation among universities, industries, governments and all sectors of society to create a comprehensive cultural atmosphere for entrepreneurship education (Li, 2019).

Finally, Israel has put creative integration of military education into the national education system. In Israel, mandatory universal military service is implemented. All Israeli citizens aged 18 years and over, male or female, shall perform military service, with possible exceptions for physical and religious reasons. Soldiers serve between 24 to 32 months depending on gender, age, and professional training. After their term of active duty, soldiers are transferred to reserve units which can assemble within 18 hours, be mobilized within 24 hours, and put into operation within 36 hours (Sun & Zheng, 2015). For the cultivation of innovative talents, the national military service system not only provides colleges and universities with high-quality talents with national spirit, but also the elite seeds that can adapt to the sometimes-harsh conditions of scientific research. Through compulsory military education, students are equipped with the qualities and abilities of collective thinking, independent thinking, a cooperative spirit, and self-reliance before entering colleges and universities. The existence of a military service reserve further promotes the development of lifelong education, which is additional evidence of education innovation in Israel.

Innovation Features in Entrepreneurship Education

In Israeli universities, the content of innovation education includes the cultivation of entrepreneurial abilities. The education of the Jewish religion and the traditions of the Jewish culture are maintained, especially the creation and accumulation of wealth. Because of this historical tradition, Israel is able to survive in a hostile environment with few resources. The main reason for this is Israel's persistent pursuit of science and technology and its continuous enthusiasm and achievements in the form of entrepreneurship. In Israel innovation is for the development of scientific and technological achievements, for security and survival for the constant accumulation of wealth. It is not difficult to understand that one of the great things about innovation education is entrepreneurship education.

Israeli entrepreneurship education is an all-around cultivation of knowledge and abilities. In the case of the Hebrew University of Jerusalem's training program, the one-year internship program requires interns to work in a challenging and meaningful work environment for at least one day a week, completing academic tasks involving research, marketing, financial analysis and strategic planning. The students' task is to combine the professional theoretical knowledge with the market practice. Interns must return to school every two weeks for a three-hour seminar on the theory, difficulties and insights involved in their assigned projects. The internship

curriculum includes: how to enter the new environment; how to identify organizational culture and its impact on organizational processes; how to identify personal and cultural values; how to identify organizational practices that help improve innovation abilities; how to identify rights and innovation; how to identify social, individual and organizational changes; and learn organizational conflict management, as well as planning and implementation through cooperation. It is not difficult to see that such internship programs not only require the improvement of theoretical knowledge, but also require the application of theories to verify and summarize the practical processes. Innovation and entrepreneurship education and professional education have merged in Israel.

The entrepreneurship education of The Hebrew University of Jerusalem is also very informative. Students must distinguish between social entrepreneurship needs and social entrepreneurship visions, and explore innovation strategies for social entrepreneurship. Through this course, students not only learn the theories and paradigms related to entrepreneurship, but also how to define the theories and paradigms that will contribute to their future entrepreneurial success. In the learning process, social entrepreneurship and business entrepreneurship will be compared and analyzed. In addition, students will also learn the basic concepts of entrepreneurship, theories related to changes, blue ocean strategies, diffusion of innovation, distribution models and sustainable development. The entrepreneurship education of The Hebrew University of Jerusalem contains the interpretation and practice of innovation, which is quite different from the current understanding and implementation of innovation and entrepreneurship education in China.

Interestingly, Israel's universal military service is also a catalyst for entrepreneurship education. According to an investigation conducted by Shen Chaohong, Wei Chunxia and Cheng Fei (2015), the universal military service system is one of the direct factors influencing Israel's rates of startups and success. The MOS model provides an effective analytical framework, with M for entrepreneurial Motivation, O for Opportunity and S for entrepreneurial Skills (Lundstrom & Stevenson, 2005, p. 22). The analysis finds that compulsory military service affects entrepreneurial motivation, along with opportunities and skills, which in turn increases the rate of successful entrepreneurship. Shen, Wei, and Cheng (2015) indicate that the compulsory regular training in the compulsory military service system has stimulated soldiers' entrepreneurial intentions. The sophisticated military technology that soldiers must master during their military service helps to build entrepreneurial opportunities after their return to civilian life (Shen, Wei & Cheng, 2015). The reserve system sets up an interactive military platform for Israelis, helping to build interdisciplinary and cross-industry entrepreneurial opportunities. Resourcefulness and teamwork skills developed during military service are important entrepreneurial skills. Military service often deals with contingencies, which improves soldiers' abilities to improvise and helps them deal with uncertainties in their entrepreneurial activities. Teamwork in the army helps to build an efficient start-up team. In conclusion, the compulsory military service system, through

the high frequency and deep interactions of diverse subjects, acts on entrepreneurial motivation, opportunities and skills, thus improving the rate of entrepreneurial success.

Conclusion

Israeli higher education is full of distinctive innovative features. The inherent innovative thinking in its education concepts, the unique education strategies for innovative talent cultivation, and the organic integration of innovation and entrepreneurship education all highlight the advantages of higher education in Israel and the reasons for its success. Israeli teaching styles, such as allowing questioning, encouraging new ideas, and promoting class discussions, are also very conducive to creating an innovative environment and encouraging innovation and entrepreneurship.

The formation of the innovation and entrepreneurship education system in Israel is a long process that has successfully integrated innovation and entrepreneurship education concepts with school education, military education and social education, to construct an innovation and entrepreneurship ecosystem covering all levels of society (Wang & Dai, 2019). The Israeli higher education model plays a significant role in encouraging and guiding the innovation and entrepreneurship reform in other countries.

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