

RESEARCHING THE EXPERIENCE OF SOME COUNTRIES ON SUPPORTING MEASURES FOR STUDENTS IN SELECTING CAREER-ORIENTED SUBJECTS IN IMPLEMENTING THE GENERAL EDUCATION CURRICULUM

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Abstract. Career orientation for students plays an important role and is the basis for students to choose appropriate elective subjects at the high school level, according to the General Education Curriculum 2018. The purpose of this research is to examine the experience of some countries in supporting students in choosing career-oriented subjects. This study investigated general education curriculum and solutions to support students in choosing subjects in several countries, such as the US, Germany, Netherlands, Norway, Australia, Singapore, and Japan. The results of this study include: 1) analyzing career-oriented goals in the general education curriculum and supporting measures for students in career-oriented subject selection in some countries around the world; 2) proposing some lessons learned for Vietnam in supporting students in choosing career-oriented subjects in implementing the General Education Curriculum 2018.

Keywords: career orientation, choosing selected subjects, General Education Curriculum

1. Introduction

The Industrial Revolution 4.0 offers new opportunities and challenges to education in training human resources. Therefore, a change in conception and thinking of the teaching and learning process is one of the important factors in moving towards fundamental and comprehensive innovation in education and training generally. Furthermore, education associated with training and career orientation is an important goal in implementing educational innovation and matching the trends of the times.

Career-oriented education

Career orientation in high school helps students become aware of their strengths, understand career fields, and know how to evaluate information about the needs of the labor market (Klapwijk, 2009) [1]. Thus, students can choose a career that is appropriate to their interests, hobbies, and family conditions and meets socio-economic development trends. However, high school students still lack information and do not have the appropriate career

orientation [2]. Socio-economic development, Industrial Revolution 4.0, and globalization are important occupations with high labor demand in the coming years, such as biotechnology, food technology, and high-quality human resources in agriculture. At the same time, several new professions will appear. Career orientation will allow students to select subjects at the high school level that suit their interests, strengths, and future career trends [3].

The Vietnamese General Education Curriculum 2018 also sets goals for high school education to help students continue to develop the qualities and abilities necessary for workers, civic awareness and personality, the ability to choose a career suitable to one's abilities and interests, conditions, and circumstances to continue studying, vocational training or participating in working life, the ability to adapt to changes in the context of globalization and the new industrial revolution [4]. Accordingly, career orientation is a process of understanding, comparing, and comparing the requirements of personal characteristics and requirements of social labor activities with specific conditions of oneself based on envisioning individual labor activities in the present and future.

Choosing career-oriented subjects

In the General Education Curriculum 2018, at the high school level, in addition to compulsory subjects, there are elective subjects. Allowing students to choose subjects according to their interests and strengths is an important content that demonstrates the progressive spirit of the curriculum. Accordingly, in addition to the compulsory subjects and educational activities, 10th-grade students can choose 4 subjects out of 9 elective subjects (Geography; Economics and legal education; Physics; Chemistry; Biology; Technology; Informatics; Music; Fine arts). The emergence of new careers in the future also requires the alternating of knowledge, such as natural and social knowledge, this direction of change will create choices and opportunities for students to meet their career orientation needs. Students will choose subjects according to their interests and by the knowledge requirements for diverse career orientations in society.

Based on previous research, interest in a subject is generally an important precondition for academic learning (e.g. Köller, Baumert & Schnabel, 2001) [5]. Classes supporting students' motivation increase the intrinsic value of math and science among students and the probability of a STEM career choice (Belinda Aeschlimann, 2016) [6]. Research has shown that students' educational and career aspirations are very difficult to change directly (Archer, DeWitt, & Dillon, 2014) [7]. In reality, to increase the number of students with career orientation in specialized fields such as science, technology, etc., teachers need to improve students' attitudes, such as awareness of science and technology applications and the work of explaining practical phenomena in subjects and the work of professions and applying various teaching methods to inspire or attract students.

Many approaches have been applied to enhance students' interest in subjects, for example, clarifying the relationship between scientific knowledge and explaining the experiences and work of scientists (Bernacki, Nokes-Malach, Richey, & Belenky, 2017) [8]. Likewise, promoting the relevance and practical application of the subject area to students and their parents is linked to increased interest and learning outcomes. students, and influence students' choice of subject-related majors (Rozek, Hyde, Svoboda, Hulleman, and Harackiewicz, 2015) [9]. Our previous study has shown the theoretically determined and empirically analyzed correlation between the characteristics of the 5E teaching model, experiential teaching, and the corresponding manifestations of teaching career-oriented competence [10].

In the 2022-2023 school year, the General Education Curriculum 2018 has been implemented for grade 10 and rolled out in the following years for grades 11 and 12. However, students entering grade 10 have many confusions and difficulties in selecting a group of subjects to study during three years of high school. In reality, schools cannot meet all of their wishes and

desires, so after a period of time in 10th grade, a group of students realizes that the group of subjects they choose does not match their abilities due to lack of direction from the last years of secondary schools. In the early stages of 10th grade, the time for students to prepare to choose career-oriented subjects before being classified is very short. Therefore, career orientation for students needs to be done in the last grade of secondary schools. Secondary schools also need to support the orientation of 9th-grade students in preparing to choose a group of career-related subjects when continuing their studies at the high school level. Therefore, this study focuses on some research questions: 1) What have been the experiences of several countries on supporting measures for students in selecting career-related subjects? 2) Based on these experiences, how to propose applications for Vietnamese schools in organizing orientation for students preparing for 10th grade to choose a group of subjects when continuing their studies in high schools according to the General Education Curriculum 2018?

2. Content

2.1. Research Methodology

In this research, we used theoretical research methods to analyze, synthesize, and evaluate the general experience of using supporting measures for high school students in choosing career-oriented subjects in some countries, such as the US, Germany, Netherlands, Norway, Australia, Singapore, and Japan. Moreover, we used expert methods to propose some recommendations for application in implementing the General Education Curriculum 2018 in Vietnam.

2.2. Research on some measures to support students in choosing career-oriented subjects in some countries

2.2.1. Research on supporting measures for career-oriented subject selection

The educational curriculum of many countries around the world has included career orientation as an important goal of education.

The German education system creates student streams based on individual abilities. After completing 4th grade, students are divided according to their abilities and interests to study in different types of schools. In most states, students enter secondary schools with some type of part-time study (part-time) in vocational schools combined with vocational training until the age of 18. In grades 11 and 12, the training program is divided into two levels: basic level and advanced level. This allows for early professional orientation without losing the benefits of general education.

In the Netherlands, many international studies of students' subject choice decisions during the last few years of high school have shown, first of all, that there are many differences in the way students choose subjects and decide on their education. Secondly, they also suggest that these decisions involve a complex combination of psychological and social factors, and the interactions between these factors are important in shaping student's choices and decisions. Thirdly, students' worlds and families have an important influence on their choices. Despite these complexities, the present study suggests two areas that appear to be particularly important in students' choices to continue or not to continue with science. These are students' experiences with school science; and their knowledge and awareness of the range of study and career options related to science. (Hipkins & Bolstad, 2005, pp. vi-vii) [11].

In Singapore, career orientation in Singapore schools goes through three stages of development. The focus of stage 1 is providing information. The curriculum approach was adopted in stage 2 when vocational education became an integral part of the school curriculum.

Stage 3 saw the integration of career guidance with information technology and the transformation of the career teacher's role from “expert” to “facilitator” [12]. Stage 1 - Providing information: The approach to providing the information is based on three assumptions: (a) Students are motivated to use the materials provided, (b) Students know in advance the type of information to look for and (c) Students know how to use the information once they have identified it. Stage 2 - Curriculum Approach: To support career guidance in schools, the Ministry of Education has issued guidance and provided materials, copies of which are provided to all schools [13]. This new program adopts a comprehensive educational approach, focusing not only on the academic development of students but also emphasizing the personal, social, ethical, and professional development of individuals. Rogers (1984) identified two approaches to career guidance in schools. The first is “complementary”, in which a specialized career guidance department is established within the school to provide career guidance to students. Second, is the alternative approach, often called the “transmission approach,” where career education is dispersed throughout the curriculum and responsibility for providing career guidance is allocated to teaching staff tablets. Professional subjects are expected to be aware of the changing career forces in their discipline and to “infuse” career guidance into the teaching of their subject [14]. Stage 3 - Integration: By the mid-1990s, career guidance had become a regular feature in the Singapore education system and many schools were moving to a phase of integration, in which responsibility for career guidance for students was shared between vocational guidance teachers; classroom teacher; school counselor; parents; and members of the community.

Schools have summarized their career guidance program to include the following activities - conducting career surveys to assess students' career needs; Individual consultation and group guidance on combining subjects, learning job application skills and job interviews; group meetings to develop decision-making and problem-solving skills; the organization of career weeks and career workshops; industry tours; and finally, shadowing and holiday work experience programs aim to allow students to experience first-hand what working life is like (Ong & Chia, 1994) [15].

In Australia, the general trend in the high school education curriculum is deep and radical differentiation at this level as well as grade 10, which is considered a transition from the basic learning model to the elective one. Therefore, in grade 10, students are often required to study several subjects (usually 6-7 subjects) according to the regulations in the school curriculum - these are English, Math, Science, History, Geography, Physical Education/basic health, and some elective subjects (some states/schools call them optional subjects). Students will choose subjects according to their career orientation, prerequisites for the 11th and 12th grade years, and university/college entrance requirements. Besides, depending on their chosen career orientation, students choose subjects. Schools often have a rich system of elective subjects in many different fields of study, meeting the career-oriented needs of students according to occupational groups. All high schools develop many different documents to guide students and parents in choosing subjects, both required and optional, such as the Subject Selection Handbook for each separate grade level, documents introducing the school, educational programs, and how to learn about subjects suitable for career orientation as well as arranging a diverse consulting team such as the Board of Directors, school principals, subject leaders, program teachers, grade teachers, subject teachers, career guidance teachers, timetable teachers... to help students career orientation and subject selection, as well as related websites for advice when choosing subjects... Information often included in subject selection guidance documents is: About the school and its educational programs; about choosing a major/career; about compulsory subjects and elective subjects; and details about each subject; The subject registration form requires students to bring it home to discuss with their parents, etc. to register

for the course (new students must register immediately upon admission; old students must register at the end of the previous year). The program structures courses according to curriculum units, with programs in the form of credits. This structure also gives students flexibility in their choices. In high school, students are not divided into classes but into groups consisting of both 11th-grade and 12th-grade students at the level they choose, led by a teacher who performs duties as homeroom teacher [16].

In the United States, schools also organize the teaching of career-oriented elective subjects. Compulsory subjects (core subjects) include Mathematics, Literature, Natural Sciences (Physics, Chemistry, and Biology - one subject per year), Social Sciences (History and state institutions), and Education physical. These are considered basic education subjects, helping all students gain basic knowledge about life. The list of elective subjects for American high school students may vary depending on the specific school and may include: Economics, Marketing, Supply Chain Management, Foreign Languages, Drama, Singing, Painting, Graphic Design, Woodworking, Sewing, etc. Most of the time when studying these subjects, students can also apply them in practice. For example, when studying Sewing, you will be able to design your costumes for other students and can use them in plays and annual school performances. Thus, in a semester, students will study about 7 subjects (of which 2/3 are compulsory subjects and 1/3 are elective subjects). Although the number of subjects is not many, the level of knowledge covered is quite wide. There are subjects like Physics, Chemistry, and Biology that every student must study, but they will only study each subject for one year. Teachers will go through all the important foundational knowledge so that students can grasp the basic content of that subject. In addition, the school does not differentiate between grades. Students can study specialized career-oriented elective subjects (Advanced Placement-AP) right from the 10th grade and can study with their 11th and 12th graders. Providing students with many diverse options, including engineering, medicine, economics, art, etc., so students can try their hand at many different fields and participate in professional clubs, thereby gaining have certain understanding about the majors and finding their direction to continue more in-depth research at the university level. The curriculum of elective subjects will also be filtered, high school students will only learn basic and necessary knowledge, helping them gain a certain understanding of that specific field of study. Because there are many different subjects, during high school, students cannot study all the elective subjects. However, students also have pre-determined ideas about their favorite majors (through family advice, through observation, research, or appropriate career tests...). Therefore, if students love art, they will also tend to choose art-related subjects such as choir, music, drama, etc. And in this case, students study any subject. But if you feel it is not suitable, you can still register for a course in another field next semester. In the US, schools completely let students explore and learn about themselves, not stereotypically, all students must study compulsory subjects. In addition, the school also regularly organizes exchange sessions with former students to share information about majors or what a working day of a pharmacist/engineer would be like, etc. That is very effective and helps students gain a more in-depth understanding of the industries.

In summary, based on an analysis of the general education curriculum and supporting measures for students in several countries, it showed that career orientation and elective subjects have been mentioned in the curriculum from goals to subject selection at high school. In the high school curriculum, students will study compulsory and elective subjects. Regarding measures to support high school students in choosing appropriate subject groups, some countries have implemented many appropriate forms such as conducting career surveys to assess students' career needs, guidance documents for students and parents, teacher consultation and School officials, the organization of career-oriented weeks and career workshops, websites, etc.

2.2.2. Research on career orientation for students through subjects

Career orientation for secondary school students is a crucial aspect of modern education. Various countries have adopted different strategies and methods to integrate career orientation into their curriculum, helping students gain a clearer view of their future careers. There are some experiences from different countries around the world as following.

In United States, numerous programs and studies focus on career orientation for secondary school students through science subjects. These programs often combine theoretical and practical teaching to prepare students with a solid foundation in STEM (Science, Technology, Engineering, and Mathematics) fields. Johnson et al. (2018) highlighted that the Career and Technical Education (CTE) program plays a significant role in helping middle school students explore and better understand careers in STEM. The authors also suggested that interdisciplinary projects and practical activities provide students with opportunities to develop problem-solving and creative thinking skills, encouraging them to pursue STEM careers in the future [17]. Similarly, Smith et al. (2020) stressed the importance of career orientation programs in schools in changing students' perceptions and attitudes towards STEM careers. Their study showed that practical activities and real-world experiences help students better visualize future career opportunities [18]. In Mathematics, Clark and Kelly (2019) analyzed how focusing on how mathematics can be used for career orientation. They pointed out that applying mathematics to real-world issues, such as in business and finance, helps students recognize the relevance of mathematics in various careers. The work also provides examples of mathematical pathways leading to different careers in fields such as STEM, business, education, and more. This motivates students to learn mathematics and consider math-related careers [19]. In Music, Thompson et al. (2020) studied how integrating vocational education into the music curriculum helps students better understand career opportunities in the music industry. They proposed organizing meetings with music professionals and practical activities like composing and performing to give students a more realistic view of careers in this field [20]. In Social Sciences, Anderson and Martinez (2021) emphasized that social studies subjects can play a crucial role in career orientation. They argued that learning about political, economic, and social systems helps students better understand careers in politics, law, and non-governmental organizations. Activities like mock trials and discussions on specific social issues provide students with more realistic experiences of these careers [21].

In Germany, it is known for its dual vocational training system, where students learn theoretical knowledge at school and practice at companies. This system helps students early recognize and prepare for future careers. According to Weber et al. (2017), the dual vocational training system helps secondary school students develop practical skills and understand STEM careers better. They stressed the importance of combining theoretical learning and practice at companies [22]. Schmidt (2019) similarly stated that the dual vocational training system provides students with a deep and practical understanding of STEM careers, recommending enhanced career orientation programs and real-world experiences to help students better understand these fields [23]. Müller et al. (2018) analyzed the challenges and opportunities in implementing the dual vocational training system in secondary schools, noting that close cooperation between schools and businesses is essential for the program's effective implementation [24].

In Norway, there was a pilot program named GV II, implemented during 2009-2010, that allowed students to understand how STEM subjects are used in various careers and experience the working life of society in the classroom. Nauta and Epperson (2003) found that the number of years of schooling and the number of science and mathematics courses in high school positively relate to choosing science and mathematics majors in college. Understanding

university requirements and confidence in one's abilities in math and science positively correlate with major selection. Participation in career experience activities and the learning environment has also been shown to significantly influence an individual's educational aspirations (Rottinghaus, Lindley, Green, & Borgen, 2002) [25].

In Japan, Tanaka et al. (2018) suggest that teaching science from an integrated perspective helps students better understand science-related careers. They propose that interdisciplinary research projects and experiments can help students comprehend the applications of science in life and work [26]. Nakamura (2019) proposed that problems related to finance, engineering, and technology can engage students' interest in mathematics and encourage them to consider related careers [27]. In music, Saito et al. (2020) emphasize that music education is not only about learning skills but also about understanding career opportunities in the music industry. The authors provide examples of effective music education programs that prepare students for careers in the music industry and other fields. Activities such as performance, composition, and meeting industry professionals help students gain a comprehensive view of music careers [28]. Yamamoto and Suzuki (2021) presented practical learning activities that help students connect social science knowledge with future career options and develop skills such as critical thinking, problem-solving, communication, and teamwork [29].

In conclusion, experiences from these countries indicated that career orientation for high school students through academic subjects is a crucial and effective strategy. Countries worldwide have adopted various methods to orient high school students towards careers through academic subjects, integrating vocational and technical courses into the curriculum, providing internships, and exposing students to real-world working environments. Methods such as STEM education, project-based learning, interdisciplinary learning, and problem-based learning have unique advantages, contributing to skill development and career awareness for students. These elements help students develop necessary skills and gain a clearer understanding of future career opportunities, preparing them better for a challenging job market. Thus, learning from these experiences can help improve the education system and career orientation for high school students in other countries, including Vietnam.

2.3. Some lessons learned for Vietnam in supporting students in choosing career-oriented subjects

Based on the analysis of experience in supporting measures for students in selecting career-oriented subjects in some countries, it was shown that promoting the awareness and developing skills of high students about career-oriented can be organized by some approaches. Firstly, there are effective methods to orient high school students towards careers through academic subjects, integrating vocational and technical courses into the curriculum, providing internships, and exposing students to real-world working environments. Secondly, methods such as STEM education, project-based learning, interdisciplinary learning, and problem-based learning have unique advantages, contributing to skill development and career awareness for students. Students have awareness and skills about career orientation through subjects and educational activities that combine learning content with practice, which will create favorable conditions for them when choosing subjects at the high school level.

In Vietnam, the secondary school stage is the basic education stage, students have access to a number of related career-oriented subjects, but their implementation in teaching is still difficult. Students are still confused when choosing subjects in grade 10. There have been a number of studies on career orientation for students that have been conducted in recent times in Vietnam. Bui Thi Thuy Hang (2017) proposed a number of recommendations for career guidance activities in high schools [30]. Nguyen Thi Kim Nhung (2018) identified the improvement of organizational forms and methods to support, guide, and advise students in the

process of choosing future careers [31]. However, these studies have not focused on supporting 10th-grade students in choosing subjects.

In this research, based on experiences in implementing support for students in choosing subjects in some countries, we proposed some recommendations for Vietnam in supporting students in grade 10 to choose subjects according to career orientation as follows:

- Enhancing teaching and learning methods such as STEM education, project-based learning, interdisciplinary learning, and experiential learning have unique advantages, contributing to skill development and career awareness for students.

- Implementing methods to orient high school students towards careers through academic subjects, integrating vocational and technical courses into the curriculum, providing internships, and exposing students to real-world working environments aim to help students develop skills and gain early career clarity.

- Conducting career surveys to assess students' career needs, guidance documents for students and parents, teacher consultation and school officials, the organization of career-oriented weeks and career workshops, websites, etc.

- At the beginning of grade 10, schools require students to register to choose their favorite profession. If there are not enough teachers and facilities, the school will cooperate with vocational schools to teach some occupations that students have registered.

- Schools propagate to students and parents the meaning of career orientation. Schools need to compile documents to guide students in choosing careers as well as subjects suitable to their career orientation. These documents need to be posted on the school's website, Facebook, etc. so that students and parents can easily find them.

- Schools need to well prepare a number of conditions to ensure career orientation for students, such as improving the capacity of teachers capable of vocational teaching, consulting, and career orientation and strengthening facilities to ensure teaching activities on a number of career-oriented topics.

- Currently, high schools in Vietnam organize career guidance teaching activities. Career guidance teachers in high schools are mostly teachers of subjects. We proposed that, regarding teacher staffing, the Ministry of Education and Training should propose to the Ministry of Home Affairs that in high schools there are vocational teachers instead of subject teachers and vocational teachers. Therefore, the quality of career orientation will be improved and more effective.

- The development of the General Education Curriculum in the coming period should stipulate several compulsory subjects, and others are elective subjects in different career fields, including traditional and modern, gifted occupations.

3. Conclusions

Analysis of the education curriculum and supporting measures for secondary and high school students in selecting career-oriented subjects in some countries highlighted that career orientation for secondary school students through academic subjects is a crucial and effective strategy. Moreover, implementing methods to orient high school students towards careers through academic subjects, integrating vocational and technical courses into the curriculum, providing internships, and exposing students to real-world working environments aim to help students develop skills and gain early career clarity.

Based on the analysis of the results, we proposed some recommendations for Vietnam in supporting students to choose subjects according to their career orientation. Firstly, enhancing teaching and learning methods such as STEM education, interdisciplinary learning, and

experiential learning, which have unique advantages, contribute to skill development and career awareness for secondary students. Secondly, at the beginning of grade 10 at the high school level, conducting career surveys to assess students' career needs, providing guidance documents for students and parents, teacher consultation and school officials, organizing career-oriented weeks and career workshops, websites, etc. are important supporting measures for students in selecting appropriate career-oriented subjects in high schools.

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