



Ministry of Education, Youth and Sport

**Cambodia**

**Education**

**Review**

**Volume 4, N.2**

**Dec 2021**

**Cambodia**

**Education**

**Review**

**Volume 4, Number 2**

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This publication is supported by the Ministry of Education Youth and Sport (MoEYS) and ADB Loan Number 3427 CAM (COL)

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**Ministry of Education, Youth and Sport**

Department of Policy

*Article*

**Factors Driving Teacher Trainees at Phnom Penh Teacher Education College to Choose Teaching as Their Profession and Their Levels of Satisfaction with its Educational Program (12+4)**

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Received: June, 2021/ Accepted: August, 2021

**Abstract**

The purpose of this study was (1) to identify factors attracting students to choose teaching as a career and become teacher trainees at Phnom Penh Teacher Education College (PTEC) and (2) to investigate their levels of satisfaction toward the new educational program (12+4) at PTEC. Simple random sampling technique was deployed to conduct the study. The questionnaire was used as a tool to collect data, and was distributed in Google Form to the two cohorts of teacher trainees. And responded by 230 participants. Frequency count, percentage, mean and standard deviation were used to analyze the data. The findings disclosed that teacher trainees were driven mostly by professional development, which seems to be the new trend in teaching profession as the majority of new teachers value and look for constant learning in their career. The following factors include individual motivation, career development, fringe benefits, and working conditions. On the other hand, trainees were highly satisfied with teaching staff at PTEC. They described their trainers as experienced, knowledgeable, skilled, and ethical. Majority of trainees also showed positive responses to the assessment, curriculum, and facilities and resources. The views on teaching have been improved if compared to the previous studies. It could be the results of the late and current reforms; however, several areas that stakeholders need to continue and start working on to enhance the profession and attract higher quality candidates into teaching.

**Keyword:** Teacher motivation; Driving factors; Satisfaction; Teaching Profession; Pre-service training

**To cite this article:** Ren, S. (2021). Factors Driving Teacher Trainees at Phnom Penh Teacher Education College to Choose Teaching as Their Profession and Their Levels of Satisfaction with its Educational Program (12+4). *Cambodia Education Review*, 4(2), 1-20.

## 1. Introduction

In Cambodia, the ideal status of teachers in the Sangkum Reastr Niyum regime has always been used as a baseline when speaking of the teaching profession (Prigent, 2016). The Khmer Rouge regime caused 80% of teacher and student depletion; therefore, the education and schooling were recovered almost from scratch (Klintworth, 1989, p. 90; UNICEF, 1990, p. 78; UNESCO, 1991, p.10; as cited in Stephen, D. J, 1996). During 1990s and 2000s, teacher reputation was negatively affected by their education background and low financial incomes (Prigent, 2016). Teachers were enlisted with the approach of those who knew more teach those who knew less as a recovery from genocide and war. Thus, the teaching force around that time, kru jat-tang, was known not any people from highly educated background. Prigent continued specifying the causes and effects of low salary as the other factor influencing public perceptions on teaching profession. According to Tandon and Fukao (2014), teacher's incomes were only 60% compared to that of other professions. An estimation of incomes in a family consisting of two married teachers and two children would be below the poverty line. Quality education was not the priority yet; thus, teacher's salary was relatively low. This financial status created a public perception of 'teachers are poor', while brought about informal payment including examination fees and extra class fees. According to Tandon and Fukao (2014), TTCs received a high number of applications; however, majority of applicants scored E from the grade 12 exam, while none scored A or B. Low quality candidates enrolled signified the popularity decline of teaching professions.

Policies around teacher education and quality management have been implemented and piloted to tackle several educational issues at the same time (MoEYS, 2015). Tremendous attention has been placed on increasing teachers' salaries. The public budget spent on education increased from 12.6% (2010) to 15% (2017) of total public expenditures (World Bank, 2019). Teachers' salary kept increasing from 80USD in 2012 to 200USD in 2017 due to the major part of the budget were spending on teachers' salaries. According to The Phnom Penh Post

(2020), by 2020, the minimum salary of teachers was 300 USD. The other major reform is the transformation of Teacher Training Centers (12+2) to Teacher Education Colleges (12+4) to ensure rigorous and high-quality pre-serving teacher training with a bachelor's degree. According to the Teacher Policy Action Plan (2015), by 2020, the pilot of the reform had taken place for 2 years already in 2 training centers: Phnom Penh and Battambang province.

Attracting academically high performing and committed candidates into teaching profession, and equipping them with right knowledge and skills are crucial means to improve teacher training system and teacher's status to public (TPAP, 2015). With all the reform over the past years, the view of the status of the teaching profession is being questioned. In line with the new reform of pre-service teacher training,, two main questions were formed to project: (1) What are the factors that drive PTEC students to choose teaching as a career? (2) To What extent are teacher trainees at PTEC satisfied with its educational program (12+4)?

The findings of this study informed relevant institutions not only what has been done and effective, but also area for improvement from the teacher trainees' perceptions to prepare and adjust policies and implementation in terms of attracting better quality candidates into teaching profession. This study also took part in evaluating the effectiveness of newly reformed educational program leading to the possibilities of achieving MoEYS's goal of moving all the Teacher Training Centers across the country to Teacher Education Colleges.

## **2. Literature review**

### **2.1. Teacher policy in Cambodia**

#### **2.1.1. Teacher recruitment**

Teacher trainees are selected through entrance exam, which implies the academic competency to enter teacher training centers. The process involves submitting application and taking the exam. The launching of application is announced by the Ministry of Education, Youth and Sport. Based on the Teacher Policy Action Plan (2015), the applications have been opened for candidates with disabilities. Furthermore, the entry was accessible for candidates up to the age of 30 holding a Bachelor's degree. Since 2015, one of the short-term interventions is automatically admitting grade A, B, and C holders of high school examination into TTCs. Last but not least, TTCs have been being upgraded to match with Teacher Education Provider Standards (TEPs). The other interventions continuing from the previously mentioned ones include piloting the 12+4 teacher training model in Phnom Penh and Battambang RTTCs, and transforming TTCs into TECs in the near future.

According to MoEYS (2019), candidates eligible for applying for lower-secondary-level teachers include fresh grade 12 graduates or equivalent degrees, and primary-level teachers with upper-secondary certificate or 5-year teaching experiences. No requirement related to scores/grade in candidate eligibility nor application. The entrance exam to 2-year training (12+2) includes general knowledge, first and second teaching subject test, while 4-year training (12+4) includes general knowledge, English and teaching subject. Applicants are also required to sign a contract of 10-year commitment working in education, and 5-year commitment teaching in their assigned school.

The passing rates of the training course at TTCs were reported to be as extremely high as 99% (Prigent, 2016). However, the academic performance in the last year of training influenced teacher trainees in several aspects. The highest scorers got to choose their desired teaching posts after the training course, while the lowest scorers got placed in the less desirable areas including remote areas with difficult living conditions.

### **2.1.3. Professional development**

In 2017, it is reported that there was no systematic and effective in-service teacher training in Cambodia yet (No & Heng, 2017). Majority of training was donor-driven, which was usually not based on teachers' needs, but rather on the organization goals or the project objectives. Those projects which were under the form of teacher professional development or teacher in-service training included Textbook Orientation Programs (TOP), subject-specific training programs (e.g., Science, Life Skills, Health, Hygiene, etc.), and policy dissemination (e.g., Child Friendly Schools, Cluster Schools, Education for All, etc.) (Prigent, 2016). Most recurrent topics for the in-service teacher training were teaching methods, subject specific upgrading and making teaching aids. Some teachers spent their own money to pursue higher degrees in some private higher educational institutions. The degree they got was not recognized by the ministry; therefore, they were not eligible for promotion and salary increment. Some strategies have been being implemented to promote professional development, involving all the key stakeholders and opening up for more public-private partnership (MoEYS, 2015).

The basic structure of the in-service teacher training in Cambodia was known as the "Cascade Model" (Prigent, 2016). The master trainers designed or adapted core concepts for workshops. The master trainers or core trainers were from the National Core Trainers (NCTs). Then, the Training of Trainers (ToT) workshops were held for groups of junior trainers. These co-trainers were from the National Institute of Education (NIE). These junior trainers would



go around and distribute the contents to province and district levels. Last but not least, mini workshops known as “echo workshops” were provided to school levels. Though responding to donors’ demands, there were three main departments which were responsible for in-service teacher training. Those departments included the Teacher Training Department, the Primary School Department, and the Secondary School Department.

One of the actions to enhance professional development was BA fast track program where 700 lower-secondary school teachers were trained to be upper-secondary school teachers at NIE (No & Heng, 2017). The World Bank has been in charge of upgrading approximately 2,200 lower-secondary school teachers, and around 310 school leaders through the Teacher Upgrading Program (TUP) and Leader Upgrading Program (LUP) (The World Bank, 2017).

#### **2.1.4. Career development**

Clear and officially stated career path for teachers and educational staff is nowhere to be found (MoEYS, 2015). Not knowing where they could go, some teachers ended up as teachers for many years, or the rest of their lives. Promoting teachers was still centralized. However, immediate attention was put into career development for teachers. According to the Teacher Policy Action Plan (2015), one of the short-term priorities was to develop a career pathway for teachers known as TCP (Teacher Career Pathway) from 2015 to 2017, and planned to share the documents and guidelines to all new teachers around 2018 to 2020.

#### **2.1.5. Working condition**

The pupil-teacher ratio in Cambodia was described as the highest of 46:1 among the ASEAN countries, whereas that of Thailand 16:1 and Vietnam 29:1 (Sothy et al., 2015). However, the pupil-teacher ratio has been improved to around 34:1 in 2021 (MoEYS, 2021).

### **2.2. Teacher policy in other countries**

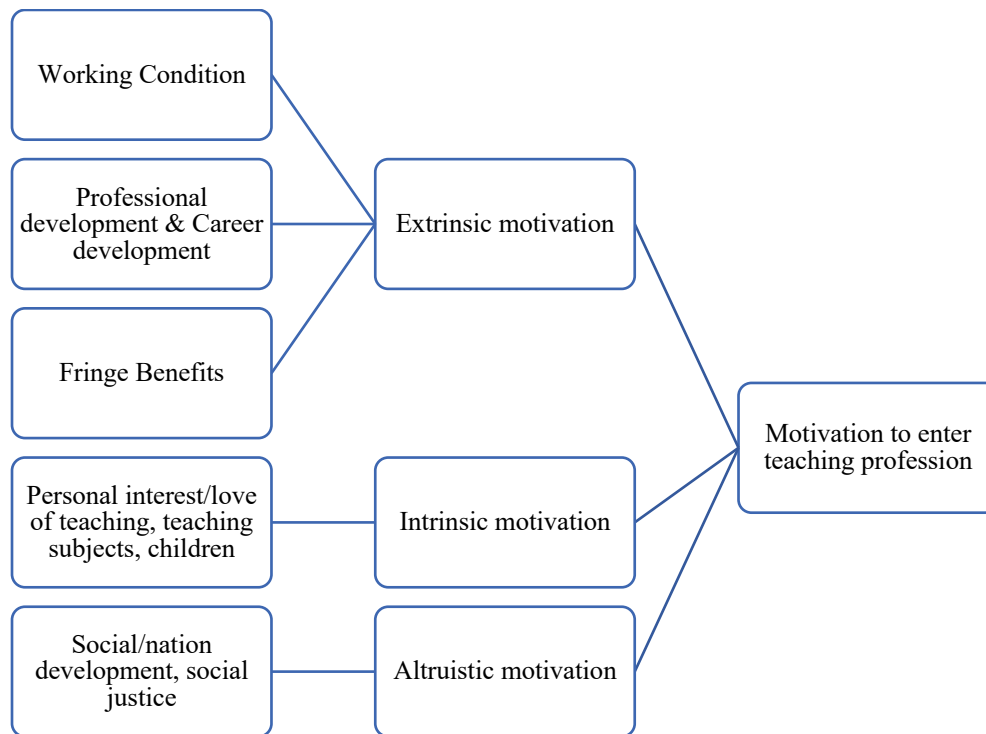
Teaching and learning quality is heavily influenced by the early teacher qualification (OECD, 2012). Many top schools around the world pay great attention to selecting teachers. OECD (2012) reported that school leaders in Singapore firmly believe in the potential of “select and train” more than “train and select”. Since recruiting high-quality graduates to join the teaching profession is challenging to any education system, policies have been implemented to attract high potential candidates to choose teaching as their career. Lavonen (2016) recaps some strategies to attract top talent into teaching that world’s top performing system shares in

common including salary during training, competitive salary, opportunity for professional growth, professional working condition, social status and efficacy.

Singapore is well-known for its interventions in selecting and supporting the right potentials to be teachers (OECD, 2012). High school students are early engaged and exposed to the teaching profession through the teaching internship opportunities. Additionally, the system in Singapore also makes mid-career entry in the teaching profession possible to bring hands-on experiences into the classrooms. The selection criteria, too, was redesigned to be more competitive, which include interviews, lesson planning preparation, and teaching demonstrations. The salary that teacher trainees receive is as competitive as that of other fresh graduates; however, with, at least, three years of teaching commitment in their school placement. According to Lavonen (2010), Singapore's talent strategy includes teachers' career paths (leadership track, teaching track and specialist track) in addition to their teaching hours. Teachers are required to attend approximately 100 hours of paid professional development per year. The performance bonus account for 10% to 30% of base salary. It is believed that the professional development, compensation and award raise the status of teaching profession and attract top talent into teaching.

In Finland, the selection process is extremely rigorous. Candidates go through a series of assessment including essay-based exam covering six to eight subjects, educational literature reading test, interviews and micro-teaching exam (Lavonen, 2010). Similar to Singapore, teacher trainees in Finland received living expenses during their training. However, Finland values teachers' autonomy and trust. There is no emphasis on career path, performance evaluation, and bonus. The only requirement is to pursue a master's degree and write research (OECD, 2012).

Teaching profession in South Korea, otherwise, is attractive in terms of job security, salary, vacation and social prestige in relation to deep cultural respect for teachers (OECD, 2012). The number of trainees recruited each year is under government's control to match the teacher demand, so that the graduates are guaranteed to have a job after training (Lavonen, 2010).



### 3. Methodology

The study aimed to capture one between the two TECs, which was in Phnom Penh. According to statistics from the report, by 2020, there were 680 teacher trainees in TEC Phnom Penh (JICA, 2017). If no barrier of social distancing, stratified sampling would be used to determine sample size of the research, which the population is divided by cohort of trainees and sex. Due to COVID-19, a convenience sampling was used to select sample size. The questionnaires were sent in Google Form to all students from the two cohorts at PTEC; nonetheless, only 230 participants responded which was equal 33.82% of the population. Limitation to this study was the representativeness of the voice of teacher trainees across the country since studying only one among the two reformed training centers, and the 24 training sites.

This study deployed a survey research design with 5-point Likert Scale and open-ended questions. The questionnaires were divided into three parts including the demographics, driving factors and satisfactions. The first two parts of the questionnaires were adapted from the relevant papers related to assessing teacher motivation and satisfaction in teaching as a career, potentially from No and Heng (2017). As participants, teacher trainees were asked to rate their levels of agreement with statements responding to the advantages of the teaching profession using five-points Likert Scales. The advantages of the teaching profession were divided into five parts including working conditions (WC), career development (CD),

professional development (PD), fringe benefits (FB), and motivation (M). Factors were computed from the respondents' rating on 5-point Likert Scales for each of the 34 items. Participants were also encouraged to provide their personal points of view at the end of each part in addition to the statements provided. The last part of the questionnaires, the levels of satisfactions, was adapted from the study on the levels of satisfactions of teacher trainees in the Teacher Upgrading Program (Sot, 2019). In addition to the 37 statements, the respondents were also offered to give their additional thoughts and insights in the form of open-ended questions at the end of each of the four parts. Teacher trainees were requested to elaborate their satisfactions about PTEC based on four areas including Curriculum (C), Teaching staff (TS), Assessment (A), and Facilities and Resources (FR). Mean and standard deviation were employed in analyzing the data. The questionnaires were piloted with one trainee from PTEC and 2 teaching fellows from Teach For Cambodia, and revised to ensure coherence, simplicity and relevance.

Primary source from the survey data collection was the main data source for this study. However, essential secondary data from relevant papers and documents were also used in the discussion and analysis. The previous papers mainly discussed in this study included the Teacher Education in Singapore: what motivates students to choose teaching as a career? (Goh & Lourdasamy, 2001), Motivations for choosing teaching as a career: a perspective of pre-service teachers from a Turkish context (Yüce et al., 2013), Improving Teacher Quality: maximizing returns on investment in teacher education in Cambodia (Prigent, 2016), and the Survey Report on Teachers and Teaching Profession in Cambodia (No & Heng, 2017).

## **4. Findings**

The findings of the study are condensed as follows:

### **4.1. Demographic characteristics**

Regarding the upper secondary school examination results (BacII), the data showed the academically diverse high school graduates enrolling in PTEC. The two highest groups held grade C (28.70%, n= 66) and D (28.30%, n= 65), followed by grade E holders (22.20%, n= 51) and Grade B holders (19.10%, n= 44). Among the 230 participants, there were only 4 trainees, equivalent to 1.70%, holding grade A as their upper secondary school examination results. Last but not least, teacher trainees were asked to give information about their educational background. 86.50% (n = 199) of the participants held a degree of upper secondary education,

whereas 13.10% (n = 30) stated to have a bachelor's degree. There was also one participant who claimed to hold an associate degree.

**Table 4.1**

*Upper Secondary Exam Grades  
of Intake to PTEC (N=230)*

Grade	Percentage
A	1.7%
B	19.1%
C	27.7%
D & E	50.5%
Total	100%

**PTEC, 2021**

*Upper Secondary Exam Grades  
of Year 1 Intake to PTTCs (N=405)*

Grade	Percentage
A	0%
B	6%
C	42%
D & E	52%
Total	100%

**Prigent, 2016**

Compared to the survey done with pre-service teacher trainees in 2016, the presence of grade A students, and the increase in the number of grade B students among the intakes to PTEC shows positive changes in how teaching profession is perceived.

## **4.2. Results of Analysis for research questions**

### **4.2.1. Findings of research question one: what are the factors driving ptec students to choose teaching as a career?**

Question one disclosed the degree to which parts of the advantages of the teaching profession attract people and guide their decisions to be teachers as perceived by teacher trainees who were receiving their pre-service training at PTEC.

**Table 4.2**

*Mean and Standard Deviation of advantages of teaching as a profession of the 5 factors driving teacher trainees to choose teaching*

<b>Advantages of Teaching as a Profession</b>		<b><math>\bar{x}</math></b>	<b>S.D</b>	<b>Level</b>
<b>Working Conditions</b>				
1	Teachers are paid enough for the job that they do.	3.57	0.926	High
2	Teachers are paid equally of what other professionals with similar education level and skills qualification are.	3.49	0.840	Moderate
3	I am satisfied with the improvement of financial and social benefits of teachers against those with similar qualifications to ensure that teachers' salaries are high.	4.04	0.829	High
4	Teachers have higher status in society these days than they used to have.	3.77	0.909	High
5	Teachers have greater autonomy at their workplaces than other professions.	3.74	0.837	High
6	Teachers are involved in policy making decisions at school level.	3.76	0.820	High
7	Teaching is a lifetime employment.	4.14	0.933	High
8	Teaching jobs are difficult to obtain even if you want to.	4.39	0.832	High
<b>Total</b>		<b>3.49</b>	<b>0.866</b>	<b>Moderate</b>
<b>Career Development</b>				
9	Teaching offers a lot of opportunities for promotion or career progression.	3.55	0.884	High
10	There is a Teacher Career Pathway (TCP) to lead professional growth and continued career progression.	3.80	0.702	High
11	There are a variety of new school roles and new positions for teachers.	3.53	0.885	High
12	The new positions come with the increase in salary.	3.57	0.917	High
13	The new roles come with high quality and effective training.	4.00	0.815	High
<b>Total</b>		<b>3.69</b>	<b>0.841</b>	<b>High</b>

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**Professional Development**

14	There is on-going professional development for teachers.	4.20	0.777	High
15	The on-going professional development for teachers is of their needs and practical.	4.06	0.739	High
16	The professional development for teachers is nationally recognized.	4.16	0.854	High
17	As a teacher, school is a place for learning and self-development.	4.24	0.902	High

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<b>Total</b>		<b>4.17</b>	<b>0.818</b>	<b>High</b>
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**Fringe Benefits**

18	Teachers have long vacations (2 - 3 months).	3.84	0.977	High
19	The teaching profession includes many fringe benefits (pension, sick leave)	4.15	0.861	High
20	As a teacher, I have time to earn extra income from other businesses.	3.31	0.956	Moderate
21	Teaching is less stressful than most other professions.	3.33	1.042	Moderate

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<b>Total</b>		<b>3.66</b>	<b>0.959</b>	<b>High</b>
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**Motivations**

22	When talking about careers, teaching is my first choice.	3.90	1.002	High
23	I love working with children.	3.91	0.849	High
24	I purely love teaching and learning.	4.23	0.829	High
25	I purely love the subject specific that I am going to teach.	4.24	0.776	High
26	I am inspired to be a teacher because of my family members.	4.27	0.904	High
27	I am inspired to be a teacher because of my relatives.	4.10	1.029	High
28	I am inspired to be a teacher because of my friends.	3.64	1.055	High
29	I am inspired to be a teacher because of the experiences with teachers who helped me.	3.97	0.911	High

30	I am inspired to change the narrative of a teacher because of the experiences with teachers who did not treat me well.	3.74	0.957	High
31	I am inspired to be a teacher because of my community.	3.64	1.034	High
32	Teachers make a difference in children's lives.	4.42	0.742	High
33	I believe teachers can make positive impacts in education.	4.36	0.801	High
34	I believe teachers can make positive impacts in society.	4.33	0.805	High
<b>Total</b>		<b>4.06</b>	<b>0.900</b>	<b>High</b>

With respect to the mean and standard deviation of the five categories of the driving factors as shown in Table 4.2, the data disclosed that the highest frequently looked on by the teacher trainees at PTEC was the Professional Development (PD) ( $\bar{x} = 4.17$ , S.D. = 0.818). Following that, Motivation (M) was the second highest recurrently resonant with ( $\bar{x} = 4.06$ , S.D. = 0.900). Career Development (CD), Fringe Benefits (FB), and Working Conditions (WC) were followed respectively ( $\bar{x} = 3.69$ , S.D. = 0.841), ( $\bar{x} = 3.66$ , S.D. = 0.959), and ( $\bar{x} = 3.49$ , S.D. = 0.866).

Quotations from participants can also feature trainees' motivation to enter teaching career. Those quotes include:

Teaching is a job that I love because it provides us a lot of knowledge to develop ourselves as well as the education sector. On the other hand, I love this profession because I want to transfer knowledge that I have to the younger generation so that they have the morality, knowledge and skills to work, and help developing the education sector in the future. (One of the participants)

Nowadays, the career as a teacher is very good (teachers are paid higher than before and more valued). (One of the participants)

There are some challenges and recommendation quoted by participants. These perspectives can elaborate their awareness of the profession while beginning their journey already.

Teachers are stressed while involving with parents and students, figuring out new ways to teach students effectively, and being pressured by surrounding stakeholders. One of the participants)



Teachers should be given opportunities to participate and get various roles, and pursue higher education. One of the participants)

#### ***4.2.1. Findings of research question two: to what extent are teacher trainees at ptec satisfied with the education program?***

Question two investigated the levels of satisfactions of teacher trainees who were pursuing the bachelor degree of education at PTEC (12+4).

**Table 4.3**

*Mean and Standard Deviation of satisfactions of the education program at PTEC regarding the 4 areas*

<b>Satisfactions in the Educational Program PTEC</b>		<b><math>\bar{x}</math></b>	<b>S.D</b>	<b>Level</b>
<b>Curriculum</b>				
1	All subjects from the program were sequentially organized from basic to advanced.	4.11	0.844	High
2	All subjects from the program give students broad understanding.	4.08	0.738	High
3	All subjects were interesting.	3.93	0.804	High
4	All subjects provided good theories related to the major.	4.12	0.738	High
5	All subjects provided an opportunity to practice and apply theories.	3.97	0.817	High
6	All subjects help you develop a good attitude (industriousness, integrity and responsibility).	4.19	0.727	High
7	All subjects provided you with sufficient knowledge for the market in the teaching profession.	4.05	0.772	High
8	All subjects provided you with sufficient skills for the market in your field.	4.00	0.790	High
9	The program raised my awareness of ethics in the profession.	4.21	0.748	High
10	All subjects integrated local, regional and global contexts.	3.96	0.750	High
11	All subjects covered both current issues and developments in my field.	4.05	0.775	High

<b>Total</b>		<b>4.06</b>	<b>0.773</b>	<b>High</b>
<b>Teaching Staff</b>				
12	Teaching staff held high qualifications (master or doctoral degrees).	4.21	0.798	High
13	Teaching staff had experience in the field.	4.26	0.680	High
14	Teaching staff were knowledgeable in the field.	4.26	0.700	High
15	Teaching staff had knowledge on current practices in teaching and learning.	4.21	0.748	High
16	Teaching staff had up to date knowledge on issues and developments in the field.	4.17	0.756	High
17	Teaching staff involved research and development activities.	4.23	0.748	High
18	Teaching staff possess good teaching methodology.	4.26	0.731	High
19	Teaching staff demonstrated creativity in teaching.	4.15	0.787	High
20	Teaching staff promoted critical thinking in their teaching.	4.16	0.762	High
21	Teaching staff integrated ICT in teaching and learning process.	4.26	0.777	High
22	Teaching staff had good interaction with students.	4.17	0.766	High
23	Teaching staff were available for help students.	3.83	0.812	High
24	Teaching staff showed ethical behaviors in dealing with students.	4.18	0.729	High
<b>Total</b>		<b>4.18</b>	<b>0.753</b>	<b>High</b>
<b>Assessment</b>				
25	The program employed various kinds of assessment.	4.08	0.749	High
26	Assessments were used to help students learn.	4.12	0.714	High
27	Assessments were used to allow teachers to reflect on their teaching.	4.16	0.749	High
28	Assessments were closely linked to real practices in the field.	4.07	0.730	High
29	Criteria for assessment were clear and fair.	4.11	0.739	High

<b>Total</b>		<b>4.11</b>	<b>0.736</b>	<b>High</b>
<b>Facilities and Resources</b>				
30	Class sizes (number of students) were appropriate for effective teaching and learning.	4.21	0.772	High
31	Classrooms were spacious, airy, and clean.	4.03	0.830	High
32	Library was accessible and useful.	3.88	0.871	High
33	Laboratories were accessible, useful and safe.	3.75	0.865	High
34	Conference halls were spacious, airy, clean and convenient.	3.81	0.808	High
35	Toilets were usable.	3.54	0.983	High
36	Parking lots were sufficient and safe.	3.57	0.963	High
37	Canteens were acceptable (price, taste and hygiene).	3.52	0.965	High
<b>Total</b>		<b>3.79</b>	<b>0.882</b>	<b>High</b>

With reference to the mean and standard deviation of the four classifications of the education program shown in Table 4.3, the data showed that the highest satisfaction was around the Teaching Staff (TS) ( $\bar{x} = 4.18$ , S.D. = 0.753), followed by Assessment (A) ( $\bar{x} = 4.11$ , S.D. = 0.736), Curriculum (C) ( $\bar{x} = 4.06$ , S.D. = 0.773), and Facilities and Resources (FR) ( $\bar{x} = 3.79$ , S.D. = 0.882) respectively.

It was 62.6% of participants were highly satisfied with the new educational program at PTEC as it met their expectations, while around 30% evaluated the program as beyond what they expected. Moreover, almost 70% expressed that they would definitely recommend others including their friends and relatives to choose the new educational program at PTEC.

## 5. Discussions

### 5.1. Discussion of question one: factors driving teacher trainees at ptec to choose teaching as their profession

Majority of new teachers expressed that they looked at teaching as constant learning itself, a career where they continually develop. The following factors include individual motivation (role in development), career development (new roles, training, lifetime salary), fringe benefits (pension, sick leave, long vacation), and working conditions (reforms on salary and social

benefits, value and respect). Benchmarking against Singapore, their study on pre-service teacher motivation also emphasized on promotion, long vacation, and the love of teaching and children (Goh & Lourdasamy, 2001). The slight difference is on the salary matter. In Singapore, salary was appreciated as one of the highest, while our trainees valued that teachers are paid for a lifetime. Still, trainees noticed that the salary had been much increased, which brought hope to the profession in the future. This shows the effectiveness regarding the reforms on financial and social benefits for teachers. A study in Turkey (Yüce et al., 2013) discussed that young people, especially in developing countries, were attracted by working condition, social status and financial benefits along with serving others and contributing in social development. The paper also highlighted that all the three types of motivation, extrinsic, intrinsic and altruistic motivation, are crucial in attracting people into teaching. Though young people can be convinced by the role in country development and doing or teaching what they love, the professional working condition and status perceived by society are often taken into consideration.

Looking back to the study in 2016 by Prigent, trainees mentioned that the low-cost and short pre-service training were some of the reasons for getting them into teaching. The other study on teacher motivation with the in-service teachers by No & Kreng (2017) revealed that the majority of the in-service teachers were not aware of career choices and opportunities. Teachers looked at teaching as something they were going to do for the rest of their working life. Furthermore, professional development or in-service training were seen as teachers' daily survival. The mindsets of constant learning and developing themselves professionally in relation to improving their teaching effectiveness or student learning was not much heard of. Therefore, trainees coming into the profession with the mindsets as lifelong learners and self-directed learners brings hope to many other reforms and solutions.

### ***5.1. Discussion of question two: the levels of satisfactions of teacher trainees at ptec toward its the education program (12+4)***

Trainees were highly satisfied with the teaching staff, and followed by the assessment, curriculum, and facilities and resources. Trainees emphasized on the quality of the trainers as experienced and knowledgeable. Not only the degrees that the trainers held had placed trust in teacher trainees, but also how trainers showed up and the quality of trainer-trainee relationship created meaningful experiences for trainees as pointed out. Nevertheless, trainees recognized the trainers' heavy workload and tight schedules. The courses, on the other hand, were appreciated for not only building knowledge, skills and mindsets, but also raising awareness

of ethics and attitude as a professional. An interesting shift in terms of the teacher trainees behaviors and perceptions towards the assessments was also brought up. Trainees viewed assessments as tools to improve and facilitate learning in addition to fairness and practicality. Last but not least, trainees were delighted with the facilities, especially the spacious, airy and clean classrooms.

## **6. Conclusion**

Based on the findings and discussion, the researcher concludes the following: (1) Trainees are attracted by the unique nature of the teaching career which enables teachers to continuously learn and improve themselves professionally, and obtains opportunities to upgrade their credentials resulting in better positions and incentives. Teachers' roles in country development, teaching as a lifetime career, and other fringe benefits for teachers are still captivating among Cambodian people despite the relatively low amount of salary compared to other professions with similar qualification and workload. Thus, increasing teachers' salary should not be the only solution to attract high potential candidates into the teaching profession. (2) With the expectations of what a teaching career would look like at its best, trainees are highly satisfied with the educational program at PTEC in all aspects, elaborated by their emerging insights on assessment and content, and the show of empathy towards trainers. Rigorous selection and training do not make teaching less attractive, but adds more value to teacher trainees and teaching as a profession by increasing credentials, skills and knowledge.

## **Recommendations**

With the findings above, the following recommendations are suggested to stakeholders to refine the teaching profession, and attract higher quality and more candidates into the teaching profession.

### ***MoEYS***

- Continue the reform on improving teacher salaries.
- Continue the reform on school infrastructures and facilities to upgrade the working environment for teachers as professionals.
- Ensure high quality training and support to well equip teachers to transition into the new roles

### ***PoE/DoE***

- Establish a system or community to support new teachers in school in terms of skills and teaching resources.
- Ensure high quality and relevant training for in-service teachers to improve teaching effectiveness and student outcomes.
- Institutionalize consistent and relevant professional development for in-service teachers to support their classroom teaching.
- Create local and abroad opportunities for teacher development and learning.

### ***Schools***

- Enable an environment for teachers to practice their creativity and autonomy in their profession to keep inspiring them that they are the agents of development.
- Establish a peer or community of teachers to learn from and support each other.
- Engage teachers in school management planning and evaluation to empower teachers as professionals and leaders.

### ***PTEC***

- Maintain the high standard of trainers in both recruitment and training.
- Increase in the number of high quality trainers to ensure sufficient energy and time for their trainees and action research.
- Increase in the number of high quality trainers specializing in each subject to expand the exposure and access to trainees.
- Ensure/maintain practicality in content and assessment.

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**Ministry of Education, Youth and Sport**

**Department of Policy**

*Article*

## **The Development of Questionnaire to Measure Science, Technology, Engineering and Mathematics (STEM) Career Choice: Evidence from Cambodia**

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Received: June, 2021/ Accepted: August, 2021

### **Abstract**

Internationally, there is a need for additional pupils to involve in science, technology, engineering, and mathematics (STEM) professions to expand the competitiveness and financial development of countries in this industrial revolution 4.0. Identifying the factors that affecting students' career choice will provide guidance for successful interventions as well as contribute to a well considerate of who want and who does not want to be involved in STEM. This will give sensible images to educators, institute career advice-givers and educationalists, concerning productive paths to restore the apparent failure of students' attention. Thus, this study aims to develop an instrument of factors affecting STEM career choice focus on female students for the context of Cambodia. The instrument development involved three stages process—literature review to support applicable items, generate a wide-ranging element group of items which will assessment the aim feature, primary trial assessment items, statistic reliability which check reliable of the questionnaire and exploratory factor analysis to control which items should eliminate from the group of items. In this study, the developed questionnaire was piloted with 195 grade 12<sup>th</sup> students from 4 different high schools in Cambodia. The analysis revealed that the Cronbach's alpha for each factory loading of survey revealed a great internal consistency. Items with factor loading below 0.400 were deleted from the survey questionnaire and some items were deleted to increase the Cronbach's alphas of survey questionnaire. Exploratory factor

analysis indicated that 110 items were grouped into four main factors, namely family factor, individual factor, school factor and environment and sociological. The newly developed toll will shed light on the assessment, and professional development to evaluate factors affecting STEM career choice within high school level pupils.

**Keywords:** STEM career choice; Survey; Social cognitive career theory; Exploratory factor analysis

**To cite this article:** Sar, M. (2021). The Development of Questionnaire to Measure Science, Technology, Engineering and Mathematics (STEM) Career Choice: Evidence from Cambodia. *Cambodia Education Review*, 4(2), 21-46.

## 1. Introduction

Science, technology, engineering, and mathematics have become to highlighted growth programs to boost economic and societal advancement of the state as specified in the Industrial Development Policy of Cambodia 2015-2025 (Ministry of Education, Youth and Shport (MoEYS), 2016). Promoting gender equality in STEM education is one of the STEM's policy strategies by encouraging female students to pursue their education and conduct research on STEM subjects and provide opportunities to women and men and institutions that work with education and research on STEM education.

More female adolescents are in institute nowadays than before, nevertheless they do not continually get equal chances like male adolescents in order to finish and get advantage from a training of their preference. Large number of females are vulnerable via favoritisms, public standards and prospects effect the value of schooling they obtain and the topics they train. They are principally less represented in STEM education, and therefore in STEM careers. Corresponding to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) groundbreaking report "Cracking the code: Girls' and Women's education in STEM", only 35% of STEM schoolchildren in college and university level universally are females, and alterations are detected inside STEM areas. For instance, only 3% of girls in college and university level select information and communication technologies (ICT) subjects. This gender inequality is frightening, particularly as STEM professions are frequently suggested as the professions of the upcoming day, pushing improvement, public wellbeing, comprehensive development, and sustainable growth. Throughout the past periods, many schools and higher education curricula have been created with the specific purpose of helping

females in selecting majors focused on science. Regardless of these efforts, profession choice is still firmly based on gender stereotyped. It has been revealed females are played down in STEM research (Nagy et al., 2008), for instance, engineering is still noticed as a male-dominated area. In this study, researcher focused only on factors influencing female students' career choice with an academic of the last year of upper secondary school education (grade 12<sup>th</sup>).

Internationally study has offered a great of understanding on career development and career choice. Factor influencing career development are comprehensive and recognized as being intrapersonal or contextual. These included outcomes on the significance of factors influence student career choice in context of developing countries with strong culture influence and big gap of gender equality as Cambodia. Those factors involve family, individual and psychological, school and society. Many studies about factors influencing students' career choices are conducted in developed countries; however, there is no previous study focusing on factors influencing students' career choice in Cambodia context. Kao & Shimizu (2019, 2020) studies on factors affecting students' choice of science and engineering majors in higher education and factors affecting Cambodian upper secondary school choice of science track. These two studies mainly focus on student major and subject choice, the studies didn't focus on students' career choice.

There are many existing instruments have been developed to measure factors influence student career choice. The studies focus on student interest: the factor which influence career choice of STEM (Bynum & Varpio, 2018; Creswell & Poth, 2016) and studies focus on peer influence with semi-structured questionnaire (Wang & Eccles, 2012; Eccles et al., 1997). However, those instruments do not included items about school variable based on Cambodian context and the current global situation. Thus, the primary purpose of this study was to develop a new instrument designed to measure the factor influence students career choice.

## **2. Literature review**

### **2.1 STEM majors and its contribution to economic development**

STEM is an acronym normally used to describe education or professional practice in the areas of science, technology, engineering, and mathematics. It is expected to build students 'conceptual knowledge of the inter-related nature of science and mathematics, in order to allow students to develop their understanding of engineering and technology (Hernandez et al., 2014). STEM majors include not only the common categories of mathematics, the natural

sciences, engineering, and computer/ information science, but also social/behavioral sciences such as psychology, economics, sociology, and political science (Kao, 2021).

As cited in Sari et al., (2017): “The 21<sup>st</sup> Century is a technology age and STEM education plays an important role in influencing the culture and economic development with a viewpoint of innovativeness, creativity and problem-solving (Cooper & Heaverlo, 2013).” Intrinsically, numerous countries in the world have created important assets in STEM learning resourcefulness generally motivated by interests about possible shortages in STEM certified specialists in the future (McDonald, 2016; Langen & Dekkers, 2005). The upcoming success of various countries is based on long term involvement with STEM learning. In the following 5 to 10 years, 75% of the quickest developing professions will need STEM linked competences and experiences (Chubb, 2013). Universal concern in STEM has boosted considerably in latest times as an immediate outcome of the decreasing interest in STEM-linked professions and the estimated influence of this nowadays and into the upcoming (McDonald, 2016). Current international learning programs and transformations have concentrated on expanding the amount of learners engage in STEM disciplines to guarantee learners are being ready and properly trained to participate in STEM professions (McDonald, 2016). According to Office of the Chief Scientist (2014), focusing on STEM fields has risen not only out of a perceived deficiency of trained laborers in new extremely high-tech subjects of professional, nevertheless also in relative to concern about STEM being educated as separate topics in institutes rather than as portion of a combined syllabus. Holmes et al., (2018) suggested while the gaps in STEM involvement are getting serious, therefore to a well considerate of who want and who does not want to be involved in STEM are going to give sensible images to educators, institute career advice-givers and educationalists, concerning productive paths to restore the apparent failure of students’ attention.

## **2.2 STEM careers and the importance of STEM career choice**

There is no standard definition of a STEM occupation. For the purposes of this Quick Take, STEM incorporates professional and technical support occupations in the areas of life and physical sciences, computer science and mathematics, and engineering (Noonan, 2017). The simple definition is that STEM careers are any positions in the field of science, technology, engineering, and math. It can be found across an array of sectors, from private businesses to big corporations, to nonprofits, to government jobs. It also requires knowledge of practice and processes that overlap the intersect the four disciplines. A person who has the career may be able to live a good and a fulfilling life. Such a person can raise a healthy family since with a good

career choice all may go well for such an individual. These and many things show how relevant a career is in the lives of all humans (Bossman, 2014). Indeed, career choice is as important as choosing a life partner since it is also a lifetime process. Just like becoming miserable when the wrong marriage partner is chosen, one can also become very unhappy of one's career so not well planned (Bedu-Addo, 2000).

According to Cambodia Development Research Institute (CDRI) (2015), Cambodia needs 35,000 engineers and 4,600 technicians to keep the nation gross domestic product (GDP) development of 6-8 percent over the next five years. The Royal Government of Cambodia has been paying close attention to these skills by strengthening and expanding STEM education service to serve national economic development and respond to career market demands as well as the Association of Southeast Asian Nations (ASEAN) integration. In order to help realize the Cambodia industrial Development policy 2015-2020, as indicated in the STEM education policy (2016), MoEYS also highlights that being a developing country and growing economy, Cambodian nation is in need of graduates in STEM fields. Therefore, to promote STEM education, MoEYS has published the Policy on STEM education because STEM are the forefront subjects and skills to realize Cambodia's long-term visions for 2030 and 2050 as specified in the Industrial Development Policy of Cambodia.

As cited in Holmes et al., (2018): "Decreasing registrations and involvement in STEM fields is an important matter for the reason that building capacity in the STEM fields is essential factor to preserving/growing output and universal competitiveness (Marginson, Tytler, Freeman & Robert, 2013, Office of the Chief Scientist., 2013)". This issue has been becoming more and more concerned at the period when society is becoming more depending on compound technologies. According to Office of the Chief Scientist (2014), focusing on STEM fields has risen not only out of a perceived deficiency of trained labors in new extremely high-tech field of professional, nevertheless also in relative to concern about STEM being educated as separate topics in schools rather than as part of an combined syllabus. Holmes et al., (2018) suggested while the gaps in STEM involvement are becoming serious, therefore a well understanding of who is and who is not interested in STEM will give sensible images for educators, institute career advice-givers and tertiary educationalists, concerning productive paths to restore the apparent failure of students' attention.

### **2.3 Extant tools to measure STEM career choice**

There are many empirical studies focus on factors influence students' career choice in STEM fields in both developed and developing countries. Most of those studies using

quantitative approach with survey questionnaire cover many variables of factors affecting STEM students' career decision-making from one, two or all constructs of career development theories such as Bandura's Social Cognitive Theory (SCT), Social Cognitive Career Theory (SCCT), and so on. The studies focus on student interest: the factor which influence career choice of STEM (Bynum & Varpio, 2018; Creswell & Poth, 2016) and studies focus on peer influence with semi-structured questionnaire (Wang & Eccles, 2012; Eccles et al., 1997). But as current situation of world facing big challenge of Covid-19 pandemic, there is a new adaptation of learning was created. Therefore, those survey questionnaire of previous study are lacked some variables.

## **2.4 Theoretical and conceptual model on career choice**

This study employed six theoretical foundations to understand students career choice: Occupational choice of E. Ginzberg, S. W. Ginsburg, S. Axelrad, J. L. Herma (1951); Super's Theory of Vocational Choice (1954); Holland's Career Typology (1959); Krumboltz's Social Learning Theory-SLT (1979), Bandura's Social Cognitive Theory-SCT (1986); Lent, Brown and Hackett's Social Cognitive Career Theory-SCCT (1987) and a model of women on construction management (Moore, 2006).

First, Ginzberg theory device into three stage of career development choice with four factors which influence students' career choice. The theory focuses on education, vision, values, goals, skill and interest. This theory does not fit with every adolescent because issue of gender, race and social class come into play to open or close door of occupational choice.

Second, Super's theory device into six stages focus on self-concept and experience. Self-concept changes and develops throughout people's lives as a result of experience. This research has omitted women, people of color and poor.

Third, Holland's theory presents the relationship of six personality and six occupational environments which mainly focus only on behavior. Individual attracted to a particular occupation that meets their personal needs and provide them satisfaction. There are gender bias in the theory because female tend to score in three personality type and attributes to our society that channels females into female-dominated occupational.

Fourth, Krumboltz's theory device into four factors mainly focus on beliefs. People's belief: self-observation generalization, world-view generalization, task approach skills, and actions. This theory is useful for both individual and group.

Fifth, Bandura's theory divide into three main factors focus on motives, behaviors and experience. A person's output is based on a mixture of: 1 personal characteristics, 2 Behaviors and actions they see from other people. 3. Outside factors.

The last is Lent, Brown, Hackett's theory which known as Social Cognitive Career Theory (SCCT) emphasize four major influences which focus on beliefs, self-efficacy, outcome expectation and personal goal. This theory is grown out of Bandura's social cognitive theory and attempts to address issues of culture, gender, genetic endowment, social context, and unexpected life events that may interact with and supersede the effects of career-related choices. The SCCT focuses on the connection of self-efficacy, outcome expectations and personal goals that influence an individual's career choice.

The career model focus on factors of non-traditional career choice refer to academic and career fields that are traditionally dominated by men. These occupations are characterized as male gender role specializations and positions that most women do not aspire to nor achieve (Winkelman, 1999). This model focus on family variable (gender role in family and parents influence), individual variables (ability, achievement, self-efficacy, and career interest), school variable (educational climate) and environmental and sociology variables (gender stereotype, role model and mentors, and counseling and advising).

## **2.5 Factors affecting students' choice of STEM careers: empirical evidence**

Career choices comprise several domains and complex processes. The effect of family assistance and opinions on STEM have been developed from various circumstances, for instance, the progress of Social Cognitive Career Theory to integrate with social contextual factors (Lent et al., 2008). Workman (2015) confirmed that parent impact was a major between the subjects in the learner choice-making process. Many researchers describe parents' gender labeling and promoted gender-typed profession decision-making affected self-perceptions of female students and their competences. It could be the reason for the less involvement of the girls and women in STEM as stated worldwide (Hartung et al., 2005; Tikly et al., 2018; Wang & Degol, 2017).

The second major factors are related to individual and psychological factor. According to Nugent et al., "Career interest is a predictor of both career preference and outcome" (Nugent et al., 2015). Researchers discovered career interest is constructively attached to the decision enroll in a discipline (Hulleman et al., 2008). School children who appear attention in STEM at the beginning in time frequently plan to learn STEM eventually (The Organization for Economic Co-operation and Development (OECD), 2005). In addition, SCCT theories explain the self-efficacy as a predictor of career interest (Fouad & Smith, 1996; Lent et al., 1994). The

character of individuality in profession choice making performance is well studied (Holland, 1959; Seibert & Kraimer, 2001; Sullivan & Hansen, 2004). Holland (1959) offered a concept indicating that an individual's career interest conveys their individuality. The concept indicated that individuality is a mixture of various factors comprising capabilities, interests, behaviors, and principles.

The third major factors are related to the experience in school. Numerous researchers examine the role of teachers and educators as crucial evidences in the procedure of adolescence's profession decision making (Yamashita et al., 1999; Howard et al., 2009; Cheung et al., 2013; Cheung & Arnold, 2014). Cheung et al. and Howard et al. reported "in both collectivist and individualistic cultures, teacher are seen as significant figures who are agents of development and could have influence on students' career decision making (Cheung et al., 2013; Howard et al., 2009). Cheung et al. also informed "pupils in Hong Kong evaluated understood effectiveness of instructors greater than parents based on lower education of their parents (Cheung et al., 2013). Additionally, Cheung and Arnold proved that pupil are firstly trust their teachers, secondly their colleagues and thirdly parents (Cheung & Arnold, 2014).

The fourth major factors are related to social and environment. According to Akosah-Twumasi et al (2018) mentioned the influence of community accountability as a major strength in adolescence profession choice was discovered by Fouad et al. (2016), who stated that the occupation choice of South Korean adolescence is affected by social beliefs. This is supported by another study, recommended that social beliefs affected adolescence profession decision-making in both collectivist and individualistic cultures (Mau, 2004; Tao et al., 2018).

Many factors influence female students' career in STEM were discovered by many studies in different contexts, but the shortfall of STEM participation has not yet been solved. Promoting gender equality in STEM education by motivating women for a many of theoretical and co-curricular can influence STEM field as career choice. This study reviewed the career development theories which fit with the context of Cambodia for the next study to investigate factors influence female students career choice in STEM. To promote female participating in STEM and choose STEM as their career for Cambodia context, detecting the issues influence interests in STEM will offer direction for productive involvements in addition to contribute to our understanding of in what way pupils study STEM content and how STEM profession courses are established.



## 2.6 Synthesis of theoretical and conceptual models and empirical evidence

Career choices comprise of several domains and complicate process. According to Gelatt's (1962) career choice model reveals the process of career choice as an on-going activity which changes by others source of fact. Outcome expectation is one the most important constructs that could inform about career choice. It assess adolescents belief of various professions based on their socio-economic situation and self-satisfaction outcomes (Abe & Chikoko, 2020). Another construct, career interest, is a prognosticator of in cooperation with career preference and outcome (Nuget et al., 2015). In addition of previous construct, self-efficacy was examined as a predictor of career interest as personal factor.

There are many existing career development theories such as Occupational choice of E. Ginzberg, S. W. Ginsburg, S. Axelrad, J. L. Herma (1951); Super's Theory of Vocational Choice (1954); Holland's Career Typology (1959); Krumboltz's Social Learning Theory-SLT (1979), Bandura's Social Cognitive Theory-SCT (1986); Lent, Brown and Hackett's Social Cognitive Career Theory-SCCT (1987). Beside Social cognitive career theory, most of the career development theory focusing on cognitive person variable and exclude extra personal variable from their theory.

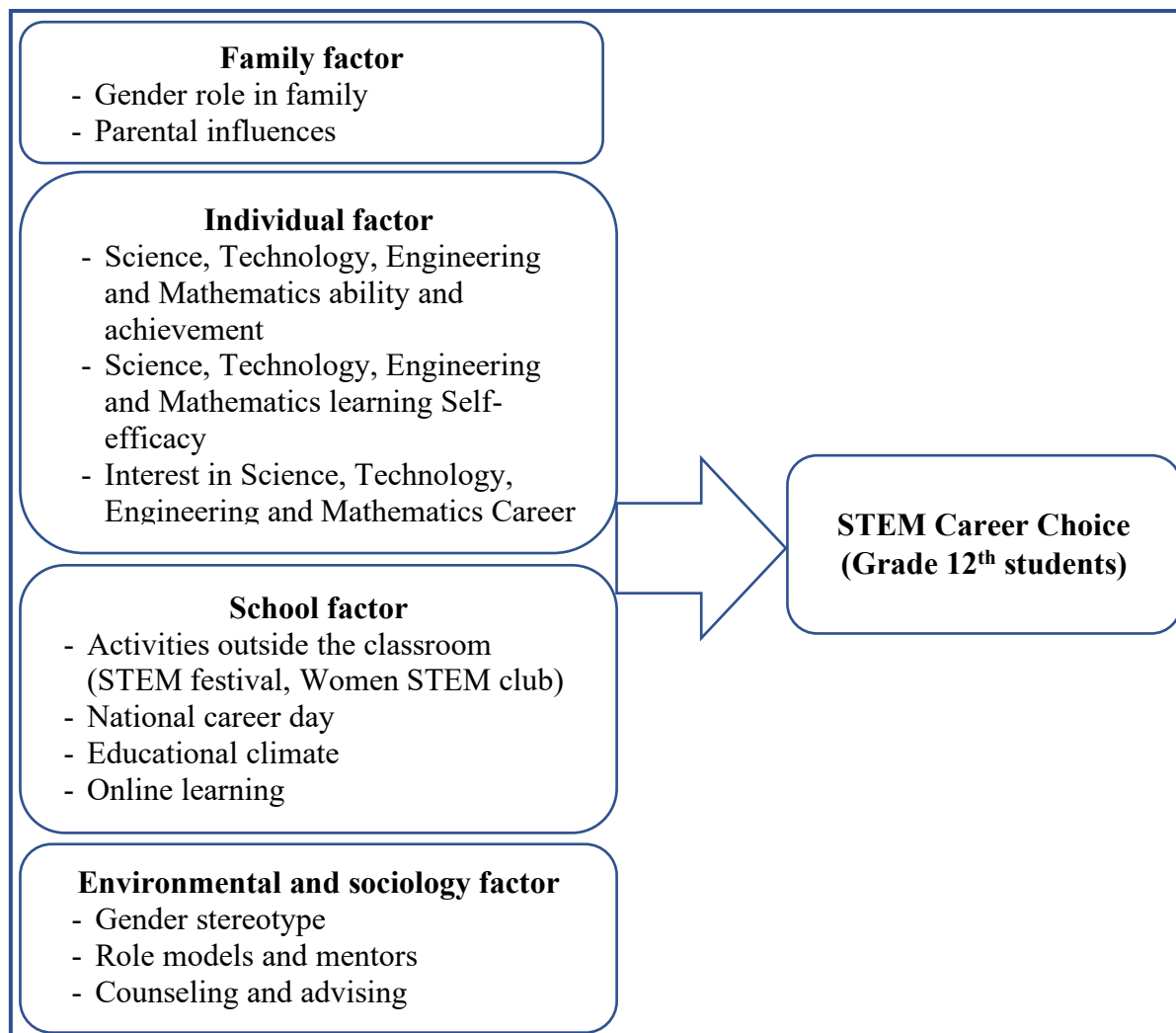
Social Cognitive Career Theory (Lent et al., 1994) grown out of Bandura's SCT and attempts to emphasize cognitive-person variable that allow persons to impact their own profession progress along with extra-person (e.g., contextual) variables. Extra-person variable such as matters of culture, gender, inherited donation, public situation, and unpredicted life procedures that may cooperate with cognitive-person variable and outdo the influences of vocational-related selections, created to clarify and the behaviors in which persons formula vocation comforts, set goals, and continue in the labor atmosphere.

As numerous of career theories, many existing research tend to emphasis on persons who are intending to go to university, university students, or university graduated. However, gender bias, gender discrimination, exclude people from difference race and social class are found in many career development theories. Even though community influence is not hypothesized to be the most influential cause of self-efficacy, these affected messages to be expected effect a young female's self-efficacy concerning on her capability to do well in a science major. A well understanding of females' and males' greatest dominant causes of self-efficacy could be used to inspire females to choose less traditional majors.

Moreover, investigating the alterations in other SCCT constructs (principally interests and outcome expectations) between males and non-females in science majors drive to improve the

understanding of vocational selections for pupils (Lent et al., 2000). The result from Kao and Shimizu (2019) revealed the most influential factors influencing pupils' selection of science and engineering majors in advanced schooling of Cambodia are the factors that deal with students' upper secondary schooling success in science and math and self-efficacy; their beliefs in enjoying the course in science and its practical nature, attitude towards science, parental occupation, sibling and relative's major, science and mathematics teachers at high school, and tracking system. Hartman & Hartman (2008) found that both male and female distinguish that male will face less barriers (with social care, value struggles, assurance, etc.) in science and engineering subjects than females. Kao (2013) also mentioned gender as factor affecting major selection. The number of girls enrolled in pure science and engineering majors in Cambodia is commonly lesser than the number of boys (Eam et al., 2019). As mentioned in previous sections, there are many factors influencing female career choice in STEM such as gender stereotypes, male-dominated cultures, fewer role models, math anxiety and so on. Different context might face different challenges, therefore, to reduce or close gender gap in STEM field we need to know the factors or barriers for Cambodia context and Secondary education is time allow students to choose their higher education (the education stage to prepare for career), we need to investigate the factors influencing secondary female students' career choice in Cambodia. Many studies about factor influencing female students' career choices conducted in developed country; however, there is no previous study focus on factors influencing female students' career choice in Cambodia context.

Cambodia has strong influence of culture and there is still a big gap gender equality. The study aims to use SCCT model but based on the Cambodia context. Therefore, this study will use the modified SCCT Model tested in study to test portion of SCCT, adopted theoretical framework from a theory of profession selection and development for female construction professionals by Moore (2006), and variables developed by researchers based on Cambodia context and current issue of education in STEM domain with a sample of grade 12<sup>th</sup> students in Cambodia.

**Table 1***Synthesis of literature and SCCT*

### 3. Methodology

The literature review contained of a search for research papers focusing factors affecting students' career choice in Science, Technology, Engineering and Mathematics, career development theories, non-traditional career choice and development, theoretical framework of career choice development. The search included using ERIC, Google Scholar, and searching using the terms *factor influence Career choice and development, instrument measuring factor affecting STEM career choice, Social cognitive career theory and STEM*, from the past 10 years. Specific subjects within STEM were also investigated to find literature involving *individual factor, family factor, school factor and social factor*. The result of searching previously described, finding suggested that there are many factors that influence STEM career choice like personal input, family and peer factor, school factor, environment factor, STEM

self-efficacy, perception of STEM career, and career interest which are described by Lent et al.'s social cognitive career theory. The literature review and theoretical framework showed the progress of our preliminary group of survey items, along with other tools determining a theory of career choice and development for female construction professionals (e.g., Moore 2006). The literature indicated the need for a survey instrument that was developed based on Cambodia's context and current issue of education in the STEM domain with a sample of high school students in Cambodia.

The progress of this survey created on former instruments (Besigomwe, 2019; Halim et al., 2018; Mtemeri, 2017; Kier et al., 2013), together with a modified social cognitive career theory model tested in study to test a portion of social cognitive career theory (Lent et al. 1994, 2000) and adopted a theoretical framework from a theory of career choice and development for female construction professionals (Moore, 2006), and variables developed by researcher based on Cambodia context as well as other developing countries and current issue of education in the STEM domain with a sample of high school students (grade 12<sup>th</sup>). The SCCT has been psychometrically assessed in expecting factors affecting career choice and currently has been employed to this new STEM career choice survey questionnaire.

Preliminary survey items were created that related to each of the characteristics of the social cognitive career theory. Researcher created a 110-item instrument with 5 statements per SCCT characteristic statements. Based on advice from science educators, researcher decided to use a 5-point Likert-type scale [responses including “strongly disagree” (1), “disagree” (2), “neutral” (3), “agree” (4), “strongly agree” (5)], therefore the items were connected properly to all the characteristics of the social cognitive career theory and that the survey questionnaires were understandable to upper secondary students.

Some construct and sub-construct were adopted from previous study and some are newly developed by researcher as shown in detail in the table below.

**Table 2**

*Construct and Sub-construct of the questionnaire*

Construct	Adaptation	Subconstruct	Example of Items
Family factors (15 Items)	Constructed by researcher	Gender role in family	My family members treat me the same as male siblings in the family

		Parents influences	My male guardian has influence in my choice of STEM as career
Individual factor (60 Items)	Adopted from Meredith W. Kier, et al., 2013; Halim. L, et al., 2018	STEM ability and achievement	I am able to get a good grade in my science class.
		STEM self-efficacy	I can obtain good grades in science subjects.
		Interest in STEM career	I plan to use science in my future career.
School factor (20 Items)	Constructed by researcher	Activities outside the classroom	I join STEM related clubs in school.
		National career day	I attend National Career Day.
		Educational climate	Generally, teacher treat male and female students the same.
		Online learning	I can do better in science and mathematics when I have online classes.
Environment and sociological factor (15 Items)	Adopted from <i>Jeofrey M., 2017 and constructed by researcher</i>	Gender stereotype	Male students have higher career ambitions than girls.
		Role models and mentors	I have a female professional as my role model.
		Counseling and advising	Advice from others influenced my career choice in STEM.

The pilot was employed to check the reliability of the newly developed survey questionnaire. The pilot questionnaire was conducted online with 205 grade 12th students from 4 different high schools in Battambang province and Phnom Penh city of Cambodia. The link of google form was provided to students to fill the survey. For all survey participants were

volunteer and they never see this survey questionnaire before. Among 205 responses, 15 responses were taken out from the study because of incomplete and duplicate.

Cronbach's Alpha will be used for checking reliability (internal consistency), and exploratory factor analysis will be used for data analysis. Acquiring the lowest number of explainable factors required to describe the correlations among the group of items by using exploratory factor analysis to investigate the dimensionality of an instrument (McCoach, Gable & Madura, 2013). The Cronbach alpha result of each sub-construct of the survey items shown in table below.

**Table 3**

*Construct, sub-construct and Cronbach's alpha*

<b>Construct</b>	<b>Sub-construct</b>	<b>Cronbach's alpha</b>
<b>Family</b>	Gender equality	.779
	Guardian influence on STEM	.860
<b>Individual</b>	Science ability and achievement	.808
	Technology ability and achievement	.749
	Engineering ability and achievement	.871
	Mathematics ability and achievement	.831
	Science learning self-efficacy	.869
	Technology learning self-efficacy	.816
	Engineering learning self-efficacy	.749
	Mathematics learning self-efficacy	.823
	Interest in Science career	.850
	Interest in Technology career	.836
	Interest in Engineering career	.879
	Interest in Mathematics career	.822
<b>School</b>	STEM related activities	.770
	Access to national career day	.863
	Teacher encouragement	.803
	Impact of online learning to STEM	.625
<b>Environment and sociological</b>	Gender stereotype	.662
	Female role model	.720
	Advice for STEM career choice	.783

## 4. Result

### 4.1 Content Validity: experts reviews

Content validity was used to examine the extent to which the items in the survey questionnaire are each aligned to four SCCT construct. First, the content of questionnaire was developed from literature review of existing theories and previous studies results. Therefore, this questionnaire content aligned with previous studies. Second, three researchers (two Cambodian and a Japanese) specialized in science education, physic education, and STEM review all the items in the survey. Since the questionnaire was developed in English, to check the translation into Khmer language, researcher has also had a Cambodian doctoral student at Hiroshima University to check for accuracy and completeness of the language. The last, factor analysis also employed in this study for checking the content validity which items loaded into one group based on the sub-construct of each factor.

### 4.2 Item reliability: factor analysis results

Exploratory factor analysis draws a huge set of variables and seeks for a way in which the data may be eliminate or shortened applying a reduced set of factors or elements. It does this by looking for bunches or clusters with the inter correlations of a group of variables (Pallant, 2011). In this study, exploratory factor analysis was used to examine the internal structure of set of 110 items and to validate the sub-constructs underlying for four main constructs i.e., family factor, individual factor, school factor, and environment and sociological factor. The construct in the study was developed based on SCCT theory, literature review on the factors affecting students' STEM career choice and content validity by experts in STEM fields. This study initially did not extend the analysis to the level of confirmatory factor analysis as the study only aimed to explore the sub-constructs underlying the identified construct-a process of developing an instrument. Based on statistical reliability and exploratory factor analysis, some items will be deleted because of low factor loading ( $<.400$ ) and to increase reliability. The items with value of Cronbach alpha higher than .6 mean the item reliability is acceptable. A given statistical result in table 4, each construct and sub-construct have been displaying indicating a factory loading and Cronbach alpha. In family factor, originally there were 15 items, but 3 items were deleted because of factory loading is lower than .400 and to increase Cronbach alpha value of each sub-construct. Based on factory analysis, two sub-constructs were created and newly name as gender equality and guidance influence in STEM. 7 items out of 60 items were deleted because the same reason as family factor. Individual factor was divided into 12 sub-factors newly name as science ability and achievement, technology ability

and achievement, engineering ability and achievement, mathematics ability and achievement, science learning self-efficacy, technology learning self-efficacy, engineering learning self-efficacy, mathematics learning self-efficacy, interest in science career, interest in technology career, interest in engineering career, and interest in mathematics career. Among 20 items of school factor, 4 items were deleted as same reason from statistical analysis. 4 sub-factors were newly name as STEM related activities, access to national career day, teacher encouragement and impact of online learning to STEM. The last factor is environment and sociological factor, 4 among 15 items were deleted. 3 sub-factors were name as gender stereotype, female role model, and advice for STEM career choice.

**Table 4**

*Factor Loading and Cronbach's alpha*

1. Family factors: 12 items (15 items in total, 3 items deleted)

Statement	Loading	Factor	$\alpha$
Q2.10.1 My family members treat me the same as male siblings in the family.	.789	<i>Gender equality</i>	.779
Q2.10.2 My relatives treat me the same as male siblings in the family.	.799		
Q2.10.3 I have an equal opportunity to go to school and choose a major I like as my male sibling.	.782		
Q2.10.4 I have an equal opportunity to choose my career as my male sibling.	.732		
Q2.11.1 My male guardian has influence in my choice of STEM as career	.697	<i>Guardian influence on STEM</i>	.860
Q2.11.2 My female guardian has influenced my choice of STEM as a career.	.746		
Q2.11.3 My male guardian encourages me to choose a career in STEM.	.765		
Q2.11.4 My female guardian encourages me to choose a career in STEM.	.738		
Q2.11.7 My male guardian's career had an impact on my choice of career in STEM.	.685		
Q2.11.8 My female guardian's career had an impact on my choice of career in STEM.	.664		
Q2.11.9 Information I got from my male guardian helped me to choose a career in STEM.	.678		
Q2.11.10 Information I got from my female guardian helped me to choose a career in STEM.	.709		



## 2. Individual factors: 51 items (60 items in total, 7 items deleted)

Statement	Loading	Factor	$\alpha$
Q3.1a.3 I will work hard in my science class.	.764	<i>Science ability and achievement</i>	.808
Q3.1a.4 I like my science class.	.592		
Q3.1a.5 I take private class for science.	.834		
Q3.1b.1 I am able to do well in activities that involve technology.	.677	<i>Technology ability and achievement</i>	.749
Q3.1b.2 I am able to learn new technology.	.761		
Q3.1b.3 I will learn about new technologies that will help me with school.	.656		
Q3.1b.4 I like to use technology for class work.	.601		
Q3.1b.5 I am able to explain other about technology.	.623		
Q3.1c.1 I am able to do well in activities that involve engineering.	.796	<i>Engineering ability and achievement</i>	.871
Q3.1c.2 I am able to learn new engineering.	.785		
Q3.1c.3 I will learn about new engineering that will help me with school.	.717		
Q3.1c.4 I like to use engineering for class work.	.818		
Q3.1c.5 I am able to explain other about engineering.	.787		
Q3.1d.1 I am able get a good grade in my Mathematics class.	.843	<i>Mathematics ability and achievement</i>	.831
Q3.1d.2 I am able to complete my Mathematics homework.	.823		
Q3.1d.3 I will work hard in my Mathematics class.	.400		
Q3.1d.4 I like my mathematics class.	.616		
Q3.3a.2 I can solve problems related to science concepts well.	.441	<i>Science learning self-efficacy</i>	.869
Q3.3a.3 I can write laboratory reports (experimental reports) correctly.	.772		
Q3.3a.4 I can collect information on scientific concepts properly.	.712		
Q3.3a.5 I am sure that I can carry out scientific experiments in the laboratory properly.	.652		
Q3.3b.1 I can download an image or video from the internet.	.686	<i>Technology learning self-efficacy</i>	.816
Q3.3b.2 I can handle everyday technological products easily (e.g., blender, microwave, toaster, rice cooker).	.754		
Q3.3b.3 I can use the computer properly.	.466		
Q3.3b.4 I can handle digital devices properly (e.g., smartphone, iPad, tablet).	.806		
Q3.3b.5 I can use social media properly (Facebook, Instagram, Twitter).	.790		

Q3.3c.1 I am sure that I can build robot from Lego.	.518	<i>Engineering learning self-efficacy</i>	.749
Q3.3c.2 I can use welding tools properly.	.761		
Q3.3c.3 I can assemble furniture.	.730		
Q3.3c.4 I can build electronic circuits.	.706		
Q3.3c.5 I can repair a broken toy.	.698		
Q3.3d.1 I can obtain good grades in mathematics subjects.	.875	<i>Mathematics learning self-efficacy</i>	.832
Q3.3d.2 I am confident that I can record data accurately.	.575		
Q3.3d.3 I can draw a graph from the provided data.	.616		
Q3.3d.4 I am competent in using scientific calculators.	.520		
Q3.3d.5 I can solve mathematical problems properly.	.789		
Q3.4a.1 I plan to use science in my future career.	.714	<i>Interest in Science career</i>	.850
Q3.4a.2 If I do well in science classes, it will help me in my future career.	.637		
Q3.4a.3 I am interested in careers that use science.	.732		
Q3.4a.4 I would feel comfortable talking to people who work in science careers.	.734		
Q3.4b.1 I plan to use technology in my future career.	.690	<i>Interest in Technology career</i>	.836
Q3.4b.2 If I learn a lot about technology, I will be able to do lots of different types of careers.	.661		
Q3.4b.3 I am interested in careers that use technology.	.765		
Q3.4b.4 I would feel comfortable talking to people who work in technology careers.	.753		
Q3.4c.1 I plan to use engineering in my future career.	.769	<i>Interest in Engineering career</i>	.879
Q3.4c.2 If I learn a lot about engineering, I will be able to do lots of different types of careers.	.744		
Q3.4c.3 I am interested in careers that involve engineering.	.888		
Q3.4c.4 I would feel comfortable talking to people who are engineering.	.812		
Q3.4d.1 I plan to use mathematics in my future career.	.656	<i>Interest in Mathematics career</i>	.822
Q3.4d.2 If I do well in mathematics classes, it will help me in my future career.	.694		
Q3.4d.3 I am interested in careers that use mathematics.	.768		
Q3.4d.4 I would feel comfortable talking to people who work in mathematics careers.	.717		
Q3.4d.5 I know of someone in my family who used mathematics in their career.	.524		

## 3. School factors: 16 items (20 items in total, 4 items deleted)

Statement	Loading	Factor	$\alpha$
Q4.1.1 I join STEM related clubs in school.	.663	<i>STEM related activities</i>	.770
Q4.1.2 I participate in a STEM festival.	.867		
Q4.1.3 I visit the STEM festival.	.807		
Q4.1.4 I participate in a STEM related competition.	.713		
Q4.1.5 I visit research centers at factories or at universities.	.567		
Q4.2.1 I attend National Career Day.	.781	<i>Access to national career day</i>	.863
Q4.2.2 I get a lot of information about my career on National career day.	.866		
Q4.2.3 I choose a career based on information I get from National career day.	.846		
Q4.2.4 National career day has influenced my career choice.	.796		
Q4.2.5 National career day is very useful.	.738		
Q4.3.1 Teacher actively encourage me to consider a wide range of career choices including those that are non-traditional.	.756	<i>Teacher encouragement</i>	.803
Q4.3.3 Generally, teacher treat male and female students the same.	.895		
Q4.3.4 Teacher expect the same achievement from females and males.	.885		
Q4.4.1 I can do better in science and mathematics when I have online classes.	.510	<i>Impact of online learning to STEM</i>	.625
Q4.4.2 I change my career choice from non-STEM related to STEM because of online classes.	.918		
Q4.4.3 I change my career choice from STEM to non-STEM related because of online classes.	.837		

## 4. Environment and sociological factors: 11 items (15 items in total, 4 items deleted)

Statement	Loading	Factor	$\alpha$
Q5.1.2 Male students have higher career ambitions than girls.	.773	<i>Gender stereotype</i>	.662
Q5.1.4 Women's role is homemaker and male's role are breadwinner.	.722		
Q5.1.5 Boys can use computers more effectively to solve problems than girls.	.826		
Q5.2.2 Female models have influenced me to choose the career I want to do.	.698	<i>Female role model</i>	.720
Q5.2.4 I have a female professional as my role model.	.845		
Q5.2.5 I have a female mentor to guide me for career choice.	.861		
Q5.3.1 I get advice from my teacher to choose a career in STEM.	.747	<i>Advice for career choice</i>	.783
Q5.3.2 I get advice from former students to choose a career in STEM.	.812		
Q5.3.3 I get advice from my classmates to choose a career in STEM.	.753		
Q5.3.4 Advice from others influenced my career choice in STEM.	.696		
Q5.3.5 I chose a career in STEM by myself.	.650		

## 5. Discussion

The purpose of this paper was to develop an instrument to measure the factor affecting upper secondary school STEM career choice focus on female students in Cambodia context. Science, technology, engineering, and mathematics have become to highlighted growth programs to boost economic and societal advancement of the state as specified in the Industrial Development Policy of Cambodia 2015-2025 (MoEYS, 2016). Identifying the factors that affecting students' career choice will provide guidance for successful interventions as well as contribute to a well considerate of who want and who does not want to be involved in STEM are going to give sensible images to educators, institute career advice-givers and

educationalists, concerning productive paths to restore the apparent failure of students' attention. The main four constructs (family, individual, school, environment and sociology) are developed from SCCT and added sub-construct (STEM related activities, Access to national career day, Impact of online learning to STEM) based on the current world situation and the new adaptation of learning processing in response of Covid-19 pandemic were used in this survey questionnaire. This study initially did not extend the analysis to the level of confirmatory factor analysis as the study only aimed to explore the sub-constructs underlying the identified construct-a process of developing an instrument.

Based on Moore (2006) study revealed that gender role in family was found to influence and/or support career choice despite varying family background demographics. Parent influence also has influence on students' aspirations for students to attend university (Lloyd et., al, 2018).

When the elementary and middle school students are engaged in discussions about goal and opportunities available in STEM, they have time to connect their interests to these subjects and demonstrate higher self-efficacy in these field prior to college (Skamp, 2007). Career interest is a predictor of both career preference and outcome (Nugent et al., 2015).

According to the COVID-19 pandemic, 2020, close to half the world's students are still impacted partially or full of school closures (UNESCO, 2021). Therefore, online learning was introduced worldwide and a sub-construct: Impact of online learning to STEM was added to this questionnaire in this condition. As the result, the factor's reliability scored the lowest among other since this were newly introduced. Interestingly, this could be a scenario of changing their career choice much easier from non-STEM related to STEM and vice versa. Cambodia STEM policy has been initiated since 2016, therefore, there are many activities were raised to promote this policy to be more interesting. At this stage, in the questionnaire, STEM related activities and Access to National career day factors were included accordingly. These should be the key to provide more information about students' interest in STEM in the context of developing countries or newly STEM introduced countries. For instance, according to the factor loading scores in STEM related activities, participating, and visiting STEM festival statements were well explained among others.

Gender has been an important point of many researchers investigate aspiration for STEM career choice (Eccles,1994; Packard & Nguyen, 2003; Shapka et al., 2006). Role models were found to be the greatest positive environmental influence on decision of women who work in construction management field (Moore, 2006). Most of the STEM related survey questionnaire were focus on STEM career interest (i.e. Kier et al., 2013; Tyler-wood et al., 2018), only few

were focus on STEM career choice. The survey questionnaire developed in this study is different from the existing surveys that measure the factor influence student STEM career choice represent an attempt to provide updated measures for factors influencing upper secondary students' STEM career choice in setting of developing country and strong culture influence with gender inequality as Cambodia. The instrument is easy to use and available online so that it is easy to implement in both formal and informal learning setting. This instrument includes new variable in school factor based on the current global situation of Covid-19 pandemic and based on Cambodian context.

The instrument used in the current study covered both interpersonal factor and intrapersonal factor which influenced career choice along with finding of Tzu-ling (2019), Yu & Jen (2019), Bennet and Phillips' (2010), and Jacobs et al. (2006). By understanding factors influencing students' career choice, STEM educators can help students in their career choice that reveal their values and experience.

## 6. Conclusion

The survey questionnaire was developed to measure the factors affecting students' STEM career choice intend to raise the consciousness of decreasing registrations and involvement in STEM disciplines, gender gap in STEM field. Based on exploratory factor analysis, two family sub factors were determined, namely gender role in family and parental influences. Additionally, four school sub factors were determined, namely STEM related activities, access to national career day, teacher encouragement and impact of online learning to STEM. The last, two environment and sociological sub factor were determined, namely female role model, and advice for STEM career choice. Other instruments have focus on segmented construct of career theories while the purpose of this instrument was to measure career choice in STEM focus on several factors.

We need to know the factors or barriers for Cambodia context and Secondary education is time allow students to choose their higher education (the education stage to prepare for career), we need to investigate the factors influencing secondary female students' career choice in Cambodia. This study details the result of the initial validation of a survey questionnaire that measure the portion of some construct in SCCT framework with extra-personal factors. A model is proposed here to measure some of these variables in SCCT construct.

## 7. Implications

The STEM career choice survey questionnaire developed in this study was shown to be psychometrically and equipped for further use by researchers or specialized developers in

Science, Technology, Engineering, and Mathematics, applying one factor or many factors or the entire themes within one instrument. Intrinsically, it is believed that this instrument will help to other researchers, specialized developers, and inspectors in determining factors that influence students' career choice in developing countries' context. The understanding that researcher achieve from the usage of this instrument will support to notify at secondary school level in Cambodia as well as other developing countries as we seek to provide career counseling or advice for secondary school students. It is strongly expected that this survey questionnaire will contribute to researching the influence of our attempts to get attention from school children to know their requirements.

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**Ministry of Education, Youth and Sport**

**Department of Policy**

*Article*

## **Girls' Leadership and Participation in School Safe Program at Primary Schools**

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Received: June, 2021/ Accepted: August, 2021

### **Abstract**

Cambodia's Strategic National Action Plan for Disaster Risk Reduction has been highlighted in two of its six components in the education sector and provided a framework for school safety efforts. The research examine school-based risks and vulnerability caused by hazards on boys and girls by exploring current practices regarding DRR integration and safe school program in Cambodian education. The research has paid attention on: satisfaction of students towards physical infrastructures at primary schools, DRR tasks delivered by boys and girls in DRR tasks for safe school, and girls' participation and leadership in safe school programs. The study also captures how relevant stakeholders from national to sub-national levels support safe school programs, all other issues that interlink with them, such as child protection and multi-hazard. The study found that (1) however schools' infrastructure are not yet fully equipped; students satisfied with building, facilities, and materials; (2) girls were more active to enaged in DRR tasks than boy due to teachers' favorite to work with; and (3) boys and girls share similar capacity and and competency to be leadership for promoting safe school programe and the DRR integration at primary schools.

**Keywords:** Safe school program; Girls' participation; Girls' leadership; Disaster Risk Reduction (DRR); Primary education; Cambodia

**To cite this article:** Chen, T. & Thou, S. (2021). Girls' Leadership and Participation in School Safe Program at Primary Schools. *Cambodia Education Review*, 4(2), 47-62.

## 1. Introduction

Since 1999, the flood has become a common event and caused increases in deaths, losses, and damages (Sok et al., 2011). The seasonal flooding was reduced than usual and led to concerns about drought in 2003 and 2004 (MRC, 2005). Over the past decades, Cambodia has been vulnerable to more regular floods and prevalent droughts (UNDP, 2014). The First and Second National Communication with United Nations Framework Convention on Climate Change (UNFCCC) notes the most significant concern is flooding. This event is commonly experienced in large areas along the Mekong River and Tonle Sap Lake. Drought is widespread throughout the country (MoE, 2009). The frequency and intensity of flooding and drought are difficult for scientists to predict; both of these events have significantly impacted on socio-economics of Cambodia.

Disaster Risk Reduction (DRR) has recently become a vital component of the quality of education and curriculum development at primary schools in Cambodia. In the education sector, DRR integration and safe school program have been carefully integrated and implemented to ensure that children are safe before, during, and after hazards. In 2007, the Ministry of Education Youth and Sport (MoEYS) introduced the child-friendly school policy to promote safe schools focusing on health, safety, and child protection. This framework initially paved the way for a more concrete strategy on DRR integration in education (MoEYS, 2007). While a child-friendly school policy is promoted, school safety initiatives and the DRR and climate change integrated curriculum are developed for primary school from grade 4, grade 5, and grade 6. Herewith, the DRR curriculum is integrated into Grade 8's earth science and geography subjects. Furthermore, to ensure a safe learning and teaching activities during the disaster, the MoEYS also disseminated the guidelines on setting up temporary learning shelters during emergencies, primarily floods, to the Provincial Department of Education, Youth, and Sport (MoEYS, 2014a).

In 2013, two policies were introduced to contribute to DRR education at schools in Cambodia. First, the line ministries developed a Climate Change Strategic Plan For Education, National Action Plan for Disaster Risk Reduction (2014-2018); this benchmark document was designed to support disaster risk reduction and climate change. Second, the National Action Plan for Disaster Risk Reduction (2014-2018) provided a framework for school safety efforts in Cambodia and made primary and secondary education resilient (NCDM, 2013). In 2014, Cambodia's EPRP or Emergency Preparedness and Response Plan clearly outlined the activities before and after a disaster. The EPRP document has been used by all ministries and institutions, as stated in the Law on Disaster Management (MoEYS, 2014b).

The research article aims to examine school-based risks and vulnerability caused by hazards on boys and girls by exploring current practices regarding DRR integration and safe school program in Cambodian education. The research has three main objectives: (1) a description of satisfaction of students towards physical infrastructures at primary schools, (2) an examination of DRR tasks delivered by boys and girls in DRR tasks for safe school, and (3) an exploration of girls' participation and leadership in safe school programs.

## 2. Research methodology

The research collected both primary and secondary sources regarding DRR integration and safe school program in Cambodia. The researcher used structured questionnaires for collecting quantitative data. Standardized questionnaires were used to collect quantitative data among students in grades 4, 5, 6 at the 15 primary schools: five in Stung Treng (current project implementation), two in Kampong Cham, and three in Phnom Penh (phased-out project) and, five in Takeo (non-target project). Stung Treng province was the center of study, so the researcher used a formula of Yamane in 1967 to calculate a sample size of the five current project implementation schools. Since Stung Treng province is the center of study, the formula of Yamane (1967) was employed to calculate the total sample size of the research study in 5 current implementation schools (Stung Treng). The procedure was used to calculate the sample size with 7% for sample error. The researcher also applied similar sample sizes for the phased-out project and non-target project schools. A total sample size of 510 students was earlier planned; 255 girls and 255 boys were equally proposed to contact for the interview—the survey students. Unfortunately, the research team could not survey the three schools in Phnom Penh due to the 20 February COVID-19 community outbreak. The research team interviewed students in Takeo, Stung Treng, and Kampong Cham for the surveys. **Table 1.** describes a total sample size of 433 students (including 216 girls) who were contacted for the interview.

**Table 1**

*Number of pupil sample size*

Type of schools	Number	Total Sample size
Current implementation (Stung Treng)	5	180 (90 girls)
Pashed out projects (Kampong Cham)	2	72 (36 girls)
Pashed out projects (Phnom Penh)	3	0
Non-target project (Takeo province)	5	181 (90 girls)
<b>Total</b>		<b>433 (216 girls)</b>

The research team also used a structured questionnaire to collect quantitative data among principals, deputy principals, teachers, and school supporting committees in Phnom Penh (Table 1). In Phnom Penh, the research team conducted phone interviews among teachers in response to the COVID-19 community outbreak measure. The research conducted fieldwork in Stung Treng, Takeo, and Kampong Cham before the 20 February Covid-19 community outbreak restriction.

**Table 2**

*Number of structured questionnaire interview*

<b>Name of schools</b>	<b>Number</b>	<b>Total sample size</b>
Current implementation (Stung Treng)	5	39 (21 females)
Phased-out projects (Kampong Cham)	2	16 (8 females)
Pashed out projects (Phnom Penh)	3	21 (8 females)
Non-target project (Takeo province)	5	40 (12 females)
<b>Total</b>		<b>116 (49 females)</b>

The research team contacted key informants by using unstructured questionnaires to interview key stakeholders; they Provincial Office of Education, school management staff and teachers. An in-depth interview was also conducted with student councils. A total of six focus group discussions were organized regarding girls' leadership and gender-transformative approach in school safety; it was derived from two FGDs for the current implementation, two FGDs for phased-out projects, and two FGDs for the non-target project schools. At each of the three types, one FGD was arranged for students and another FGD for teachers. Each focus group discussion was organized and participated by six students or teachers, including three females and three males. These activities served as tools for searching perceptions of the local decision-makers. Field observations were carried out at all 15 schools to gain more physical and visible information about school safety in terms of physical infrastructure, social events, activities involved, participation of students, especially girls, in disaster risk management. However, the research team could not conduct surveys with students at the three schools in Phnom Penh; field observations were applied to ensure that data collected through phone interviews with principals and teachers were validated. A consultative meeting was organized with JAG DRR EWG for a survey; they included Save the Children, World Vision, Plan International, CRF, and ChildFund Cambodia. The consultative meeting was organized to present the preliminary findings, collect feedback, and discuss policy application and future planning. The presentation took the form of a forum to facilitate interaction between the

researchers and NGOs regarding the research findings and for purposes of validation and clarification.

Desk review was an essential part of the assessment by collecting, organizing, and synthesizing available reports and previous assessment and raw data of the projects. The consultants understood the project context and results produced by the project against formulated indicators and issues. The desk review also helped to identify problems and gaps faced by the project. Problems and situation analysis facilitated the exploration of the available position or context in which the project beneficiaries in the target schools or institutions operated within a specific period. The findings elicited from using this technique provided the context and knowledge for assessing the implementation of a disaster risk management program. The ultimate goal of this research was expected to offer key insights and lessons into successes or challenges that the project has faced, particularly with the focus on girls' participation and leadership. This research hoped to go beyond just informing the implementation of the other half of the project cycle but inform the nation-wide advocacy.

For quantitative analysis, The Statistical Package for Social Science (SPSS) software was primarily used for data processing and analysis. The study employed both descriptive, Weighted Average Index (WAI), Independent-Sample T Test and F-test (ANOVA). Weighted Average Index (WAI) was used to rate the degree of vulnerabilities and satisfaction of teachers and students towards disaster risk management at the study schools. The five-scales were: (1) considerably less; (2) less; (3) moderate; (4) high; (5) very high. F-test (ANOVA) was applied to test whether there was a significant difference between the means of the three types of study schools: current project implementation project schools, phased-out project schools, and non-target project schools. F-test was applied for both student and teacher questionnaires. Independent-Sample T Test was used to compare the mean score of a sample with a known value (e.g., attitude and practice of students towards disaster risk management). Only a student questionnaire was used for the Independent-Sample T-Test.

### **3. Results**

#### ***3.1 Satisfaction of students towards physical infrastructures at primary schools***

Overall, the students were satisfied with school facilities, especially the building, library, treatment from teachers while teaching, and language used by teachers. Female students shared higher satisfaction towards campus environment, water storage, toilet, seating with boys, treatment from teachers while teaching, and language used by teachers (**Table 2**).

**Table 3***Perception of students towards the school facilities*

Attributes	Girl (n=216)		Boy (n=217)		Overall (n=433)		P-value
	WAI	OA	WAI	OA	WAI	OA	
School building	0.82	VH	0.80	H	0.81	VH	0.132
Classroom	0.80	H	0.79	H	0.79	H	0.553
Classroom wall with picture describing gender	0.80	H	0.76	H	0.78	H	<b>0.007</b>
Playground	0.80	H	0.78	H	0.79	H	0.099
Canteen	0.66	H	0.65	H	0.66	H	0.328
Campus environment	0.81	VH	0.78	H	0.80	H	<b>0.037</b>
Library	0.85	VH	0.83	VH	0.84	VH	0.077
Water storage	0.75	H	0.72	H	0.73	H	<b>0.017</b>
Toilet	0.67	H	0.62	H	0.64	H	<b>0.009</b>
Seating with boy	0.75	H	0.71	H	0.73	H	<b>0.007</b>
Seating with girls	0.76	H	0.72	H	0.74	H	<b>0.005</b>
Treatment from teacher while teaching	0.86	VH	0.83	VH	0.85	VH	<b>0.007</b>
Language used by teacher	0.86	VH	0.83	VH	0.84	VH	<b>0.004</b>

Key informants with the Provincial Department of Education (PoEYS) in Takeo, Kampong Cham, and Stung Treng reveal that schools' facilities were very significant to reduce the vulnerability of students and teachers from hazards. But most schools did not have sufficient budgets to improve facilities for safe schools yet [**PoE in STR, PoE in TKO, PoE in KPC**]. However, students reveal their high degree of satisfaction towards their schools' facilities; it does not reflect good conditions of study schools. All the students accepted the available facilities, and they learned well about the timing required for improvement. Facilities of the study schools in Phnom Penh and Kampong Cham were improved and had a better capacity to cope with hazards. Overall, schools in Takeo had better conditions than Stung Treng in terms of buildings, classrooms, canteen, campus environment, toilets, water storage, and library. During group discussions, students in Stung Treng and Takeo were satisfied with the building, campus, and library; students in Kampong Cham were concerned about the campus environment and ponds surrounding schools. Principals at some schools, such as Boeung Trav Bun Rany Hun Sen primary school, prepared sanitary pads if female students had the first period unintentionally during their classes [**FGD in STR, FGD in TKO**].

In Takeo, World Vision installed playgrounds for children, but many schools did not allow children to play with some items because they were dangerous. Most study schools reported



incidents caused by the iron playground. In Stueng Treng, Child Right Froundation (CRF) sponsored a mathematic-shaped garden; they have served as an educated and joyful time for children during break. Unfortunately, the hot weather and lacked of maintenance destroyed this beautiful garden at Pong Tuek Primary School. The Garden at Veal Ksach primary school remained good because teachers asked students to water every day [**Per Communication-Teacher in STR**]. The teachers agreed that the condition of school facilities was in good condition except for the drainage system, which was a low degree, especially at current implementation project schools. Teachers reveal that school facilities at phased-out and non-target project schools were good conditions; they assessed moderate degrees at current implementation project schools (**Table 4**). The local authority in Takeo raised a significant role of drainage system to mitigate impacts from heavy rain, but many schools are covered by water during rain. If rain happens in the early morning, students face difficulty walking on the way to school and the school campus [**Per Communication- Teacher in TKO**] CRF and World Vision also improved the schools' infrastructures; they worked with individual schools to respond to their needs. Observation shows that most schools had tanks for storing water in the dry season, hand washing, waste burning station, and garden. All the schools were decorated with slogans based on the three pillars of disaster risk management. All the principals and teachers appreciated the importance of handwashing during COVID-19; students could wash their hands regularly.

**Table 4***Conditions of school facilities*

Attributes	Phased-out projects (n=37)		Current implementation (n=39)		Non-target project (n=40)		Overall (n=116)		P-value
	WAI	OA	WAI	OA	WAI	OA	WAI	OA	
Set up school fence and entrance	0.64	H	0.48	M	0.56	M	0.56	M	<b>0.002</b>
Layout and furnishings of classrooms to allow for evacuation and survival	0.72	H	0.53	M	0.72	H	0.66	H	<b>0.000</b>
All buildings and non-structural facilities, including the playground, should be safe from both	0.64	H	0.60	H	0.70	H	0.65	H	<b>0.031</b>

disaster and non-disaster related risks									
Latrines and toilets are safe for both boys and girls and disabled students (sanitary pad disposal system, enough hand washing system, locked toilets with enough lightings)	0.68	H	0.47	M	0.73	H	0.63	H	<b>0.000</b>
Develop school garden and plant trees	0.75	H	0.57	M	0.71	H	0.67	H	<b>0.000</b>
School facilities accommodate extreme weather events and other hazards such as drought, floods (rainwater harvesting, open-air circulation, etc.)	0.74	H	0.57	M	0.75	H	0.68	H	<b>0.000</b>
Good drainage system as well as elevated school ground [if floods are the hazard]	0.42	M	0.21	L	0.49	M	0.37	L	<b>0.021</b>

Schools in Phnom Penh and Kampong Cham had better conditions in terms of the school building, campus environment, toilets, and gardens. Principals and teachers at all the study schools reveal the significance of the lightning protection system to be equipped at their schools because students were terrified during rains. Some schools also experienced attraction by lightning, for example, Hun Sen Kah Dach Primary School. In Takeo, World Vision supported all its target schools with a lightning protection system. Unfortunately, CRF did not have a sufficient budget to provide lightning protection systems at all the targeted schools in Kampong Cham, Stung Treng, and Phnom Penh. For example, CRF only sponsored Hun Neang Bakheng Primary School. The other two schools also requested it, but the organization did not have the budget for installing it [**Per Communication-JAG DRR EWG Comunsultative Meetoing**].

**Table 5** confirms all required materials for first aid, prevention, and response to hazards were fully available at all three types of schools. While the current implementation project schools shared a lower proportion of anti-bacterial ointment and face masks, balm was less

available at non-target project schools. In contrast, forceps were less available at phased-out project schools than the other two types of schools. The PoE officers in Kampong Cham, Takeo, and Stung Treng similarly explained that NGOs actively worked to support schools to reduce the impacts from hazards. At the same time, principals at the 15 schools thanked the government, NGOs, and local authorities, who provided materials and equipment to prevent suffering from hazards.

**Table 5**

*Materials available as first aid, prevention, and response to hazards*

Attributes	Pashed out projects (n=37)	Current implementation (n=39)	Non-target project (n=40)	Overall (n=116)
Scissor and nail-cutter	91.9	100.0	97.5	96.6
Forceps	67.6	100.0	97.5	88.8
Gloves	97.3	100.0	100.0	99.1
Cotton	100.0	100.0	97.5	99.1
Alcohol	100.0	100.0	100.0	100.0
Betadine	100.0	100.0	100.0	100.0
Anti-bacterial ointment	100.0	59.0	95.0	84.5
Sterilized bondages	91.9	100.0	97.5	96.6
Plasters	100.0	100.0	100.0	100.0
Balm	100.0	94.9	77.5	90.5
Triangular bondages	100.0	100.0	100.0	100.0
Face-mash	97.3	76.9	95.0	89.7

### 3.2 DRR tasks delivered by boys and girls in DRR task for safe school

**Table 6** reveals that teachers preferred to assign DRR tasks to girls (66.4%) than boys, especially phased-out (91.9%) and current implementation project schools (71.8%). On the contrary, teachers at non-target project schools pointed out that boys were more effective in DRR tasks than girls (37.5%). The views of boys and girls were similar regarding the effectiveness of students. Boys at phased-out project schools and girls at non-target project schools effectively supported DRR tasks for safe schools. According to a student at Ang Soklang Primary School, girls had a more substantial commitment and listened to teachers than boys. The teacher preferred to ask girls to do school work because girls always listen to teachers' instruction [**Per Communication-Student in TKO**]. Girls at school in Takeo have delegated the task to monitor boys, not play the rain. Boys liked playing during rains which are

not very safe [**Per Communication-Student in TKO**]. Girls showed better performance than boys when school assigned them some tasks and responsibilities. In addition, girls do not play a lot, and they pay great attention to the task assigned [Per Communication-FGD in TKO]

**Table 6**

*Effectiveness of boys and girls in DRR task for safe school*

Attributes	Phased-out projects	Current implementation	Non-target project	Overall
<b><i>Perception of teachers</i></b>	(n=37)	(n=39)	(n=40)	(n=116)
Girl	91.9	71.8	37.5	66.4
Boy	8.1	28.2	62.5	33.6
<b><i>Perception of students</i></b>	(n=180)	(n=72)	(n=181)	(n=433)
Girl	38.9	48.9	53.6	49.2
Boy	61.1	51.1	46.4	50.8

Almost all the teachers believe that teamwork selection of DRR tasks requires gender equity and gender equality in DRR assignments. Only one-tenth of teachers wished to separate the DRR task group separately according to boys and girls; one of them at current implementation project schools agreed on this arrangement. In contrast, more than half of the students (62.8%) wished to assign the DRR task group separately according to boys and girls, especially students at phase-out project schools. The majority of the students applied for gender equity in teamwork selection of DRR task and equity in DRR task assignment (**Table 7**).

**Table 7**

*DRR tasks and responsibilities sharing between boys and girls*

Attribute	Phased-out project	Current implementation	Non-target project	Overall
<b><i>Perception of teachers</i></b>	(n=37)	(n=39)	(n=40)	(n=116)
Do the DRR task group you separately according to boys or girls?	21.6	0.0	12.5	11.2
When selecting teamwork, do DRR tasks consider gender equity?	94.6	100.0	95.0	96.6
Do you think gender equity in the DRR task assigned is essential?	91.9	100.0	97.5	96.6

<i>Perception of students</i>	(n=180)	(n=72)	(n=181)	(n=433)
Do the DRR task group you separately according to boys or girls?	75.0	65.0	55.8	62.8
When selecting teamwork, do DRR tasks consider gender equity?	79.2	88.3	63.0	76.2
Do you think gender equity in the DRR task assigned is essential?	83.3	87.8	71.3	80.1

The teacher and school management team were closely monitoring gender equality among girls and boys. The schools were taking care of maintaining girl participation and girl enrollment to make sure that they are not ignored. In particular, girls are included in school development and work [**Per Communication-Teacher in TKO**]. A group discussion among students at Pong Tuek Primary School reveals that girls needed more attention from schools and local authorities because there were more vulnerable to different types of disasters. Teachers and parents were playing significant roles to regularly support girls to be away from violation [**Per Communication-FGD in KPC**].

### 3.2.1 Girls' participation and leadership in safe school programs

The students had different views from the teachers; they roughly agreed on similar roles of boys and girls in DRR tasks for safe schools (**Table 8**). Out of the total, 43.9% of the students confirmed that girls are the leaders in the DRR task at their schools; it was a higher proportion at phased-out project and current implementation project schools. More than half of boys (59.7%) at phased-out project schools required more discipline in carrying out DRR tasks.

**Table 8**

*Perception of students on DRR task for safe school program*

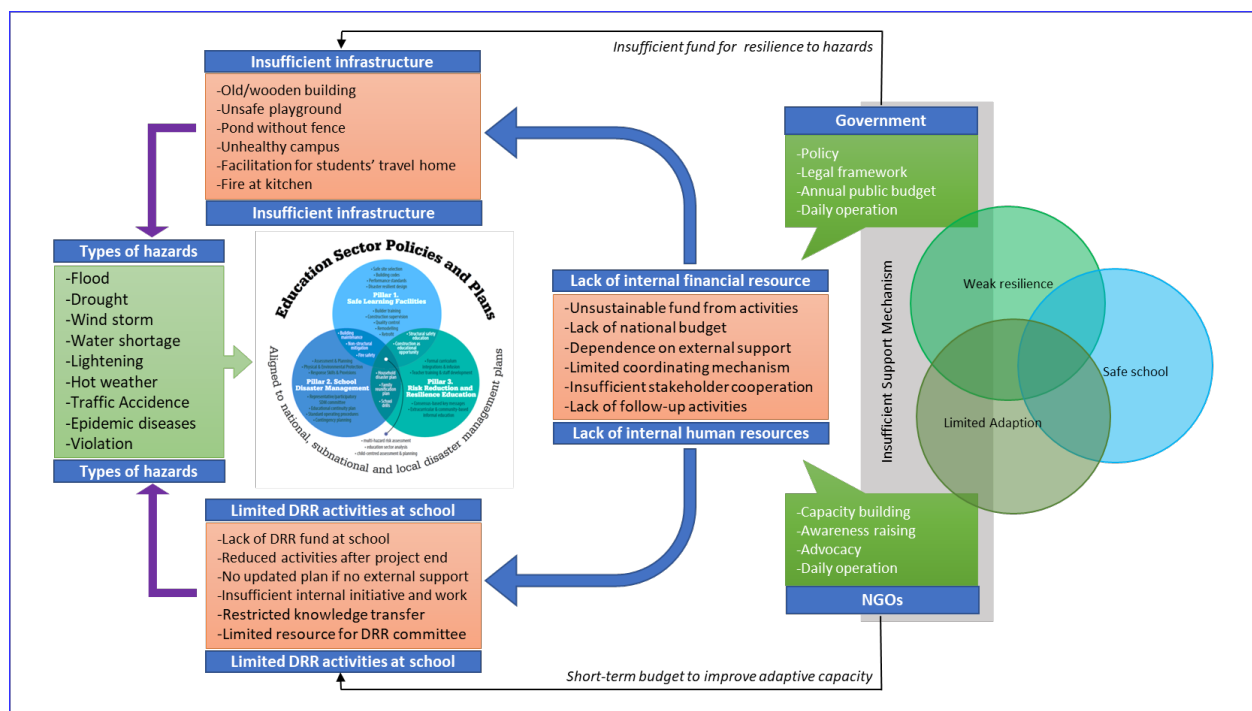
Attribute	Difference	Phased-out projects (n=180)	Current implementation (n=72)	Non-target project (n=181)	Overall (n=433)
In general, who do you think consumes more instructional attention in carrying out DRR tasks at your school?	Girl	33.3	43.9	39.2	40.2
	Similar	45.8	35.6	32.6	36.0
	Boy	20.8	20.6	28.2	23.8
	Girl	8.3	26.1	33.1	26.1

The students who require more discipline in carrying out DRR tasks.	Similar	31.9	40.6	39.8	38.8
	Boy	59.7	33.3	27.1	35.1
In general, who do you think talks more, or in general, dominates the DRR task?	Girl	30.6	33.9	32.6	32.8
	Similar	50.0	32.2	31.5	34.9
	Boy	19.4	33.9	35.9	32.3
During teamwork, who are the leaders in the DRR task?	Girl	56.9	46.1	36.5	43.9
	Similar	15.3	27.2	22.7	23.3
	Boy	27.8	26.7	40.9	32.8
In the DRR program, who is generally shown in the lead roles?	Girl	43.1	40.0	22.7	33.3
	Similar	26.4	28.3	35.4	30.9
	Boy	30.6	31.7	42.0	35.8
In your school, the students who seem to excel in involving in DRR tasks.	Girl	41.7	38.3	35.9	37.9
	Similar	40.3	32.8	36.5	35.6
	Boy	18.1	28.9	27.6	26.6

A boy at Srey Bandith Primary School describes that “I think girls are the best leaders in student councils because girls are more discipline than boys. Girls can perform better than boys. I think schools do not allow mid for boys or girls to be leaders, but they care for the capacity and contribution of the work [**Per Communication-Teacher in TKO**]. In contrast, some girls also raised good points of boys in disaster risk management. A girl at O'Trel Primary School suggests that “I think boys are doing better in disaster risk management because most of the work is physically needed. Also, girls are very easy to be panic, and they cannot do well during the disaster. But girls dare to raise their concern and issue in front of local authority” [**Per Communication-Student in STR**]. Another girl at Boeung Trav Bun Rany Primary School also mentioned that “I do not think the girl can be a leader in disaster risk management because they are physically weak. They need to stay in a safe place if there are some incidents. Boys can help the school a lot and boys also have a role in helping the girl as well. Girls are also easy to cry if there is some problem” [**Per Communication-Student in STR**]. A boy at Hun Sen Svay Sronos Nos Primary School mentioned that “I think the girl has no capacity to lead the team; they have poor leadership skill. But girls can do a good performance with instruction from teachers because they do not have initiative. In addition, girls are not able to manage the situation well. If there is any shock, girls are panic” [**Per Communication-Student in KPC**].

#### 4. Discussion and Conclusion

In 2012, the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRES) developed a comprehensive school safety framework (CSSF). This framework has been used to support and guide disaster risk reduction (DRR) and resilience management in the education sector. This framework is well aligned with the Sendai Framework for Disaster Risk Reduction (SFDRR) and Sustainable Development Goals (SDGs) (UNDRR, 2017). Based on qualitative and quantitative data collected during fieldwork, problems and constraints were identified against three pillars of the CSSF, as shown in Figure 1.1.



**Figure 1.1.** Problems and constraints based on the three pillars of the safe school program

The implementation of a safe school program is essential to mitigate the vulnerability of children in the education sector. All three types of study schools are supported or used to get support from NGOs to implement safe school programs. However, safe school programs are reducing vulnerabilities of children; the study schools are still facing: (1) insufficient infrastructure, (2) limited DRR activities at school and (3) lack of internal financial resources. One of the major issues of school safety is insufficient infrastructure; most schools did not have a good condition of infrastructures such as building, playground, and campus environment. Most of the schools at the current implementation projects are old and wooden buildings; the buildings are strong enough to stand in strong wind. For example, building Veal Ksach Primary School experienced collapse by the strong wind. Another new building was constructed with

support from NGOs and communities; it is still not safe for children. There was also a record of a forest fire at Pong Tuek Primary School; this incidence caused fear and the same damage to school properties. In Takeo, all the study schools were equipped with ironic playgrounds supported by NGOs, some of the students experienced a slight or bloody injury. As a result, the principals banned children from playing some part of the playground to avoid any injuries.

In general, NGOs such as World Vision, Plan International, and Child Rights Foundation are assisting the schools for capacity-building awareness-raising to establish safe schools. Moreover, NGOs provide technical and financial support for schools to develop an action plan for DRR response. At the same time, NGOs also worked with schools to implement activities as proposed in the action plan. The qualitative analysis reveals that schools did not have an internal budget to implement activities offered in the action plan for DRR response. Activities implemented to achieve an action plan for DRR response were largely dependent on NGOs' support. The support of MoEYS and NGOs has built capacity, raised awareness, developed action plans, and establishment of DRR structure. Each school also established a structure of student councils, and NGOs are integrated their DRR work through this system as well. Unfortunately, schools did not have sufficient internal budget to implement all those activities, and the existing structure also did not function well. For example, the review of action plans for DRR response at the phased-out schools was not updated or implemented anymore after a phase-out of CRF. The main reason during fieldwork was mainly due to lack of budget for the implementation of the DRR response. However, the result of the consultative meeting reveals that the update of the DRR action plan and internal capacity building for new teachers and students do not require findings. The capacity building and awareness-raising by NGOs during the project implementation have provided sufficient capacity and skills for principals and teachers to prepare their action plans and share knowledge among their teams. But, Kampong Cham study schools do not pursue those activities after completing the project.

All the schools are operating with an annual budget from the MoEYS of education; According to an officer from the MoEYS, the Ministry has allocated for the budget to run the school, including salary, school maintenance, and other operating cost. The MoEYS have learned that a safe school program is very useful for reducing vulnerability from hazards. Therefore, the MoEYS is cooperating with development partners to directly implement the program at the school level. The MoEYS are welcoming for all the development partners and NGOs to support the school for integration of DRR, but the Ministry has no sufficient fund to



support the school for continuing the activities after completion of the project. During the interview, MoEYS, NCDM, and JAG DRR EWG shared similar views about the sustainability of projects implemented by NGOs. While schools do not have internal funding, the MoEYS did not have an additional budget to allow schools continuing activities implemented by NGOs. The officer from the MoYES reveals that the core work of MoYES is operating to provide general education free of charge. At the movement, the MoEYS do not have the budget to add up extra activities for the integration; however safe school program is already adopted as a national policy. At the same time, an officer at MoEYS raised a concern about the insufficient follow-up of the project after NGOs phasing out. She believes that follow-up is made either by implementing NGOs, the Provincial Department of Education, Youth, and Sport (PoEYS), or the District Office of Education, Youth and Sport (DoEYS); activities somehow remain implemented at schools.

The research comes up with three main conclusion: (1) however schools infratructure are not yet fully equipped; studnets satisfied with building, faciltiies, and materials. Overall, the students were satisfied with school facilities, especially the building, library, treatment from teachers while teaching, and language used by teachers. Female students shared higher satisfaction towards campus environment, water storage, toilet, seating with boys, treatment from teachers while teaching, and language used by teachers. The teachers agreed that the condition of school facilities was in good condition except for the drainage system, which was a low degree, especially at current implementation project schools. Teachers reveal that school facilities at phased-out and non-target project schools were good conditions; they assessed moderate degrees at current implementation project schools. The research confirms all required materials for first aid, prevention, and response to hazards were fully available at all three types of schools. While the current implementation project schools shared a lower proportion of anti-bacterial ointment and face masks, balm was less available at non-target project schools. In contrast, forceps were less available at phased-out project schools than the other two types of schools.

(2) The research reveals that teachers favored to allocate DRR tasks to girls (66.4%) than boys, especially phased-out (91.9%) and current implementation project schools (71.8%). On the contrary, teachers at non-target project schools pointed out that boys were more effective in DRR tasks than girls (37.5%). The views of boys and girls were similar regarding the effectiveness of students. Boys at phased-out project schools and girls at non-target project

schools effectively supported DRR tasks for safe schools. (3) The students had different views from the teachers; they roughly agreed on similar roles of boys and girls in DRR tasks for safe schools. Out of the total, 43.9% of the students confirmed that girls are the leaders in the DRR task at their schools; it was a higher proportion at phased-out project and current implementation project schools. More than half of boys (59.7%) at phased-out project schools required more discipline in carrying out DRR tasks.

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**Ministry of Education, Youth and Sport**

Department of Policy

*Article*

## **Retention and Motivation of Rural Teachers for Long-Term Employment in Secondary Schools in Kampong Cham Province**

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Received: June, 2021/ Accepted: August, 2021

### **Abstract**

This conductive research was designed to find out the teachers' living and teaching conditions and how they be linked to the teachers' retention and motivation. The results of this study could be used to help the teachers' retention at the secondary school level, especially in rural areas in Cambodia. This research has identified main causes of the teachers' teaching and living conditions. First, most of the teachers demanded to improve their teaching career such good enough salary, teaching material, school buildings, and suitable teaching workload. Truly, among of needs above, salary and incentive were what those teachers really insisted requesting and obtaining. It means that the teachers' current salary was not enough for supporting their living because those teachers needed to spend the money for their children, food, equipment, bill, and including treatment. In addition, some of teachers' teaching capacity were still low, so those teachers requested to improve their teaching qualification by providing training courses and scholarship to continue their studies. Second, the teachers' living conditions was also another roof course to impact on the teachers' teaching. Especially, the teachers who were from other provinces to work in both secondary schools located in Kampong Cham province. Lacking of suitable staying, teachers were not satisfied of staying because these schools did not have accommodations or houses for their staying, so they met difficulties for their living situations. Further that, female teachers really concerned to their unsuitable living. Those teachers had to rent houses at district town was far from their workplaces, so they spent much time to go to schools. Furthermore, the road conditions were terrible such as dusk, shake, and

slide as could be dangerous for the teachers' travelling. Another reason, the teachers felt isolated because of living far from their families. Those teachers had willingness move to their homeland, but they needed to have enough official criteria and conditions for transferring from their schools. This research report is seeking to identify teachers' motivation and retention for long term employment and including difficulties in their teaching and living conditions. So, solutions can be proposed by MoEYS, Kampong Cham Provincial office of Youth and Education, teaching communities, and schools' structures in order to facilitate the teachers' teaching and living condition be better.

**Keywords:** Motivation and retention; Long-term employment; Living conditions; Kampong Cham; Cambodia

**To cite this article:** Meas, V. (2021). Retention and Motivation of Rural Teachers for Long-Term Employment in Secondary Schools in Kampong Cham Province. *Cambodia Education Review*, 4(2), 63-86.

## 1. Background

After Khmer Rouge regime (1975-1979), Cambodia educational system has gradually upgraded and changed. the Ministry of Education, Youth and Sports (MoEYS) had determined the improvement of quality of education through the reforms of curriculum, textbooks and the change of the teaching-learning approaches. Obviously, three main reforms on educational system had been conducted as the following: First, from 1979 – 1986, the education system was introduced as a 10-year education (4+3+3) that four years for primary education, three years for lower secondary, and three years for upper secondary. Second, the education system was revised into of 11 years (5+3+3) between 1986 and 1996. This system covers 5 years at primary, 3 years at lower secondary and 3 years at upper secondary level. Third, the MoEYS adopted 12-year education from 1997 to present time; it consisted of six years for primary, three years for lower secondary and three years for upper secondary education levels (6+3+3) (Kitamura *et al.*, 2016).

Teachers were the main key people who played important roles to provide students with the education, and they were also the main key resources who contribute to develop the country. Moreover, teachers are playing a pivotal role in providing education to the students. It is the facts schools tried to recruit good and qualified teaching staff that can deliver quality education to its students. Only highly qualified and committed teaching staff or teachers can produce

effective results by producing good quality of students, who contributed to their country in future (Hadi and Tehseen,2015).. If the qualified teachers leave intentions from the schools or teaching field, then it had negative impacts on students and schools' performance that led an education system of generally poor quality, so it was very essential to keep the highly qualified teachers to deliver good quality of education (Hadi and Tehseen,2015).

The MoEYS has afforded to innovate and developed Cambodian educational system. To solve the issues of retaining teachers defeats the purpose for increasing the supply of teachers. The Cambodia Education Strategic Plan (2019-2023) states that the MoEYS is one of the priority Ministries in the overall government reform process covering financial management and human resources management. In Cambodia, 60% of civil servants had been managed by MoEYS. There remains a need to increase the staff establishment. The present restrictions on annual recruitment did not meet all agreed staffing norms. On the other hand, there were disparities in teacher distribution between urban and rural areas, especially disadvantaged areas; furthermore, the enhancement of teacher quality is likely to be quite costly. Increases in teacher salaries, incentives such as loan-forgiveness programs, heightened teacher preparation requirements, and other efforts to prepare, recruit, and retain high-quality teachers are all associated with substantial costs (MoEYS, 2014).

However, the teachers in rural areas faced up problems and challenges to be settled which include teachers' living and teaching conditions in retention. In fact, the teachers' living conditions in rural areas which faced up difficulties of living to cause teachers were uncomfortable to live because the remote areas are far from town which lacked of transportation, accommodations, compensation for free health service, leave and prepaid payment in case of financial problems and extra teaching allowances, and security (Mary, 2010). In addition, teachers live far away from school and spending a lot of time while traveling to school which also affected their teaching; in fact, the teachers were difficult to go to schools in raining because roads were slide and shake (Dungu, 2000). And other teachers who were transformed from one another place to another place in order to complete their jobs that they separated from their families and had difficulty to adapt to new living places (Maicibi, 2003).

The teachers' second job was another point that effected to teachers' teaching because teachers in rural areas were also frequently absent from their classes during the planting season or undertaking additional jobs. They did farm, grew crops, run owner business, and had tutoring classes in order to get more supplement income for supporting their families. Truly, Teachers' salaries were very low in Cambodia were barely sufficient to support living costs. Teachers

therefore have second jobs as motor taxi drivers, farmers, workers and sellers to supplement their income. This situation seriously affected the quality of teaching and learning. Furthermore, teachers did not have enough time to update lessons or monitor student performance. This was also a main factor that affected dropout rates. Strong leadership, teacher capacity development and meaningful incentives can help to reduce dropouts (Khieng *et al.*, 2015).

The teachers' teaching conditions had emerged as the main source of teacher job dissatisfaction and teacher turnover that impacted on the progressive basic educational system in Cambodia. Teachers in remote areas still lacked of supports that made them decided to leave their jobs due to working conditions that include lack of school administrative supports, student discipline problems, poor student motivation and lack of decentralization in decision making process regarding classroom by the teachers than that of other reasons such as salaries (Ingersoll and Smith, 2003). Moreover, increasing workload, class of large sizes, programs, and changing curricula are major demotivation factors in many schools. Thus, the size of classes and heavy load made the teachers to become resistant against new teaching methodologies and other innovations in teaching career (Maicibi, 2003).

Some of teachers in rural areas were not qualification for teaching. In fact, the teachers completed lower and upper-secondary schools that they did not have enough teaching pedagogy and methodology. Lack of teachers' qualification that present restrictions on annual recruitment do not follow the standard because the number of newly trained teachers does not meet the needs of schools. More teachers are retiring than are starting teacher training because they finish grade 12 that the brightest students do not apply for teacher training (Kem and Sem, 2016). In addition, teachers are inadequately experienced fill education positions was that inadequate training to fill vacancies, however, may simply exacerbate shortages, as insufficient certification is one factor that contributes to increased teacher attrition (Sothy *et al.*, 2015).

The teachers should be offered appropriate training that can provide teachers with the teaching qualification, information, and skills they need to feel effective in their roles and meet the demands of their positions (Billingsley, 2004). In addition, lack of opportunities further study and career which is low opportunity to go to study at higher education to have more capacity building for their further work. Remote areas offer limited social opportunities that the teachers cannot function well at school as well as have to further job promotion. The teachers in rural areas may have fewer opportunities to receive professional development. When teachers consider their futures, social opportunities come into play. These limitations have been shown to increase teacher attrition in rural school districts (Buchanan *et al.*, 2005).

In addition, lack of professional development in rural school districts plays a significant role in the decision to leave the rural classrooms, and it is also an apart of the reality of rural school districts that are typically remote and isolated with reduced resources (Stone, 1990). So rural teachers have fewer opportunities than the teachers in town and city why they would see as a disadvantage to their jobs. Another factor, most schools in rural areas are still not enough facilities such as books, teaching material, building, and library which made the teachers and students were difficult to teach and study. Truly, the limited quality of education can also be attributed to a lack of teaching materials, which relates to the government-published textbooks for all grade levels (Ingersoll and Smith, 2003).

In fact, many schools in the rural areas still met the issues in education because lacking of retention of rural teachers for long-term employment. The teachers had challenged the issues which happened in their living and working conditions. Attrition rate of teachers in public education, or the velocity at which teachers leave the profession is disproportionately higher than for other professions (Liu and Meyer, 2005). Additionally, a review of research has shown that the rate of teacher attrition is higher for beginning teachers than experienced teachers. Within the first five years of teaching, about a third of teachers leave the profession (Darling, 2003). A latest study indicated that the attrition rate was even greater and within the first three years of teaching, about one out of every three teachers leaves the profession (Smith and Smith, 2006).

Almost 40% of former novice teachers identified the pursuit of a better job or career as their main reason for leaving the profession, and teacher retention research can be done by exploring the relationship between teacher turnover and teachers' own characteristics, student body characteristics, and school characteristics. Moreover, allowances, salary, and bonus lead to teacher's superior performance to have a great positive impact on their satisfaction which results into their effective performance as well (Mary, 2010). The teachers have different perceptions regarding job satisfaction which impacted on their intention to stay in teaching or school. Shann (1998) argued that teacher job satisfaction is the predictor of teacher retention and a determinant of teacher commitment which contributes to the school effectiveness.

Accordingly, the research aims to examine retention and motivation of rural teachers for long-term employment at secondary schools by focusing upon: (1) characteristics and working conditions of the teachers, (2) reasons of why teachers are changing new working schools, and (3) teachers' satisfaction towards motivations and retentions.

The retention and motivation of teachers' teaching are how to motivate and support teachers keep staying for long-term in their teaching career. Terms of attraction, retention, and concentration as something that determines what attracts individuals to teaching, how long they remain in their initial teacher education courses and subsequently the teaching profession, and the extent to which they engage with their courses and the teaching profession (Sinclair, 2008). Recruitments of the retention and motivation are achieved by creating good and interesting workplaces with possibilities of development, by showing good leadership and appreciated working (Bennel, 2004).

Teachers are the main key resources to provide students education and develop the country. However, being the teachers faced up many problems which they must challenge and struggle issues in their teaching and living conditions. The issues in teachers' teaching condition. First, poor school leadership and administrative supports. According to Luekens (2004) found that nearly 40% of teachers left teaching profession due to lack of administrative support that impacted of school contexts in public schools. Minarik *et al.*, (2003) the quality of the relationship between teachers and school principal has significant impact on teachers' productivity and loyalty. The principal of school is the main leader who handles the schools' operations and to responsible for the growth of teachers' teaching as well. In addition, lacking of school infrastructure is another problem with schooling in Cambodia including school material, school buildings, libraries and laboratory rooms which impacted on teaching and learning. At the lower secondary schools have poor school buildings and not enough places. So, the lack of teaching materials in all schools limits the quality of education (Sem and Kem, 2016).

Second, the Ministry of Education Youth and Sports increased the teacher's salary between USD 186 to 250 for secondary teachers; however, the teachers in rural areas still do not suitable enough salary to support their families. Teachers' payment has been low and leaving teachers unable to support their families without taking a second job to increase their income (MoYES, 2014). The low salaries cause teachers' job dissatisfaction and the low teachers' compensation was also a major factor for teachers' dissatisfaction with their jobs. So, it was originally proposed that there should be incentives to encourage teachers to work in remote areas (Shann, 1998).

Third, issues in teachers' living conditions. Teachers' housing or accommodations are important for teachers' living condition because most of teachers who changed for different provinces need safe living places as a priority and further significant for the female teachers. In addition, other schools are far and terrible roads for travelling which made teachers meet



difficulty in their teaching (Kem and Sem, 2016).

Furthermore, after the teachers completed pedagogical training courses of schools in Phnom Penh and provincial towns, the Ministry of Education Youth and Sports transferred them worked in secondary schools which located different areas in the provinces even Kampong Cham. The teachers had to separate from their family because of teaching duty, and they felt isolated and difficult to adapt to new living places (Green and Letts, 2007).

In the rural areas have over-crowded classes that are hard to teach. The remote schools cannot support teachers' needs in terms of food, clothing, medicine and electricity. And, the poor condition of roads outside is terrible travelling in the raining season and dry season such flooded, slide, and dusk that caused both teachers and students were difficult to go to schools and miss attending classes (MoYES, 2014). So, the distance from schools, geographical isolations, a long rainy and dry seasons, all of these factors can have negative impacts on students' performance and, directly or indirectly, affect student outcomes in terms of cognitive development, grade repetition and drop-out (Billingsley, 2004).

There are a variety of views on the motivation of teachers in developing countries and South Asia. Similar to Cambodia, the majority of teachers working in schools in developing countries are not well motivated by a combination of declining in morality, satisfaction in the workplaces, lack of controls, inadequate incentives. In addition, teachers' behavior, knowledge and teaching experiences which influence their turnover (Buckley *et al.*, 2005).

First, professional development skills which the teachers should be offered training and study courses in order to improve the building capacities in their teaching career. The teacher's motivation is the most important of all factors. A teacher's intrinsic drive towards self-improvement cannot be matched with any amount of pressure from the educational managers. For real Teacher Professional Development, the teacher herself/himself has to perceive it positively. The teacher has to see and accept the need to grow professionally. A teacher who perceives professional development positively is eager to attain new knowledge, skills, attitudes, values, and dispositions (Komba and Nkumbi, 2008).

In addition, the teachers should be given opportunities to contribute to curriculum development and help implement new instructional practices. It is also vital that teachers be recognized for their efforts. Further stakeholder, teachers must be recognized and honored for their contributions. Teachers who collaborate toward mutual goals are more likely to assume a shared investment and collaboration among faculty helps unify their purpose and strengthen their commitment to the school professional collegiality is a strong contributor to teachers' job satisfaction ( Woods and Weasmer ,2004).

Second, the teachers' salaries contribute in their retention. Teacher's good compensation may inspire teachers' intention in schools. And high teachers' salary as an effective strategy to reduce the turnover issues of teachers. On the other hand, many studies have found that low salaries were the main predictor of teachers' turnover behaviors ( Kelly, 2004). In order to improve teachers' living condition, MoEYS could consider further increases to teachers' enough salaries and provide other benefits such as payments for gasoline and food allowances that match the price of goods in the market. Therefore, increasing teachers' salaries could also improve the quality of education by reducing the need for teachers to take second jobs. Then they would have enough time to create lesson plans and correct students' homework. This could deter them from taking money from students for extra classes (Hem and Sem,2016).

To maintain teachers' job satisfaction is important of successful educational reform. Thus, identifying variables that have a direct effect on teachers' job satisfaction is vital to reduce teachers' attrition and facilitating true reform in education. Furthermore, maintain teachers' job satisfaction is one of the main factors associated with teacher quality and retention (Shann,1998). Job satisfaction has been widely studied by organizational researchers representing several fields, and has been linked to organizational commitment and performance. The study of teachers' job satisfaction holds similar importance. To investigate the relationship of characteristics of teachers' backgrounds, teachers' school, teachers' compensation, working conditions with teachers' job satisfaction. And found a significant relationship between favorable working conditions and teacher job satisfaction (Perie *et al.*, 1997).

In order to help education system in Cambodia, according the concept of teachers' performances and retentions. According to Mary (2010) qualified, motivated, and effective teachers which relied on motivation, recognition and prestige, professional growth, salary, adequate infrastructure and teaching materials, responding to stakeholder. includes School material, social environment, and budget. In addition, the social context also impacted on teachers' living conditions which are comfortable living places, good enough services, and safe travelling (Hirsch and Emerick, 2007). Teachers' quality which contains professional development, good school leadership, and enough material of teaches' motivation (Smith ,2006).

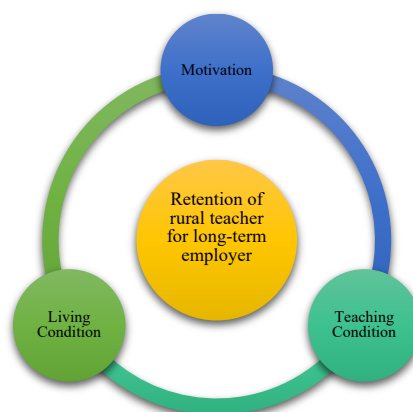
In this research, teacher dimension framework adopted from Performance Dimension Mary (2010) will be applied. The teacher dimension framework will be used to access performance of in rural teachers in Cambodia. The dependent variable is teacher's performance and retention which is variable of primary interest. We attempt to explain the variance in dependent variable

by three independent variables of (1) motivation, (2) living condition, and (3) teaching condition. First, motivation which includes salary, promotion, training course, and school infrastructure impact on teaching qualification. Second, living condition that includes providing accommodations, budget for travelling and health service, and prestige. Third, teaching condition that contains school and administrative supports, school material, and building capacity.

In fact, level of degrees, pedagogical training courses, and teaching supports of the teachers are the most important influent factor in order to stay in the rural areas for long-term employment in the same time at the school level requires provide motivation and opportunity. The motivation, for example, salary, incentive, and bonus will help to enhance the working performance of the teachers. Moreover, the teachers need opportunity and supports such as promotion, capacity building, accommodations, and more budgets in order to attract them to stay long-term.

Benefit package and opportunity costs point out:

Monetary incentives can either be direct or indirect benefits. Direct monetary incentives refer to salary and allowances that teachers receive for their work. The most direct and effective way to increase the number of secondary school graduates entering teaching and to encourage those already in teaching to remain as teachers is to increase salary to a level that makes teaching more attractive than alternative career options. While raising salaries is an effective incentive for building a more qualified teaching force, it is not very useful for shaping the specific behaviors of individual teachers. Furthermore, once a teacher is given a salary increase, it is generally permanent. If the behavior being sought is temporary, such as accepting a three-year teaching assignment in a remote area, giving a permanent incentive is not very productive (p.8).

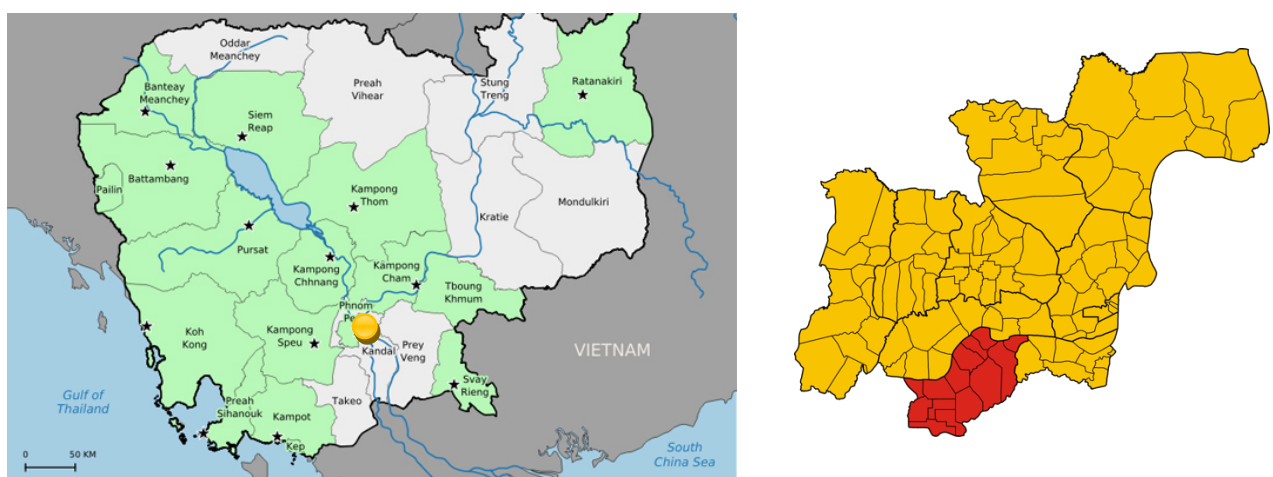


**Figure 1.** Teachers' Performance Dimension Framework

## 2. Research Methodology

This research was conducted in Kampong Cham province. This province is located in the eastern heard of Cambodia bordering following provinces: Kratie to the Northeast, Vietnam to the East, Prey Veng to the South, Kampong Chhnang to the west and Kampong Thom to the Northwest (Map1). The province is one of other provinces in Cambodia with a total of 899,791 people. Further that, it is divided up into 9 districts, with 173 communes and 1,748 villages. Srey Santhor is a district to south of the Kampong Cham province (Map2), which is divided to 14 communes and 86 villages. The district consists of 81,687 people and 3,480km<sup>2</sup> areas.

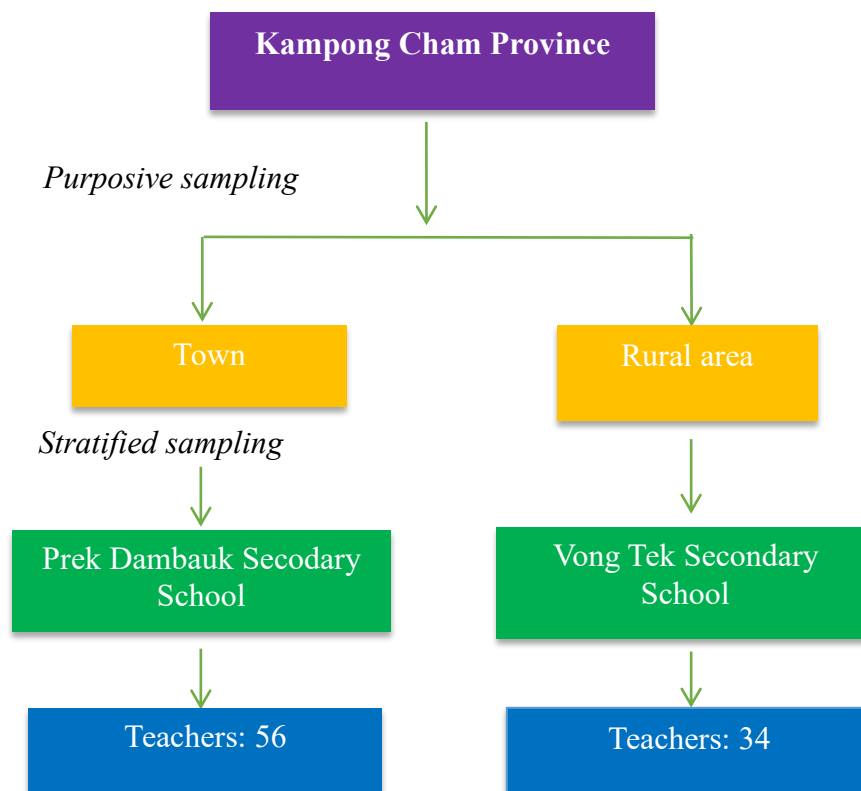
A descriptive research type was used in this study by using a survey to collect quantitative at two different secondary schools, one in the town and another at the rural area in Kampong Cham province, Cambodia. This was a quantitative method and the researcher used a descriptive research type to describe perception of public secondary school teachers towards retention at school and long-term employment as teachers in Kampong Cham province in Cambodia. The research was conducted two the public secondary schools which had different situation which located in town and rural area. This is a quantitative method and the researcher used a descriptive research type to describe perception of public secondary school teachers toward retention at schools and long-term employment as teachers in Kampong Cham Province in Cambodia. The research was conducted at Prek Dambauk-Secondary School which located in town, and Vong Tek-Secondary School which located in the rural of Srey Saranthor district, Kampong Cham province (**Figure 2**).



**Figure 2.** Map of Kampong Cham province, Srey Santhor district

The formula proposed by Yamane (1967) was used for the sampling design. In this study, the formula was used to calculate the sample size with 7% of precision. The number of respondents for a teacher survey was calculated after the reconnaissance survey, field observation and discussion with teachers. With this sample size, the finding is well representative to the views of the teachers at the two study schools.

A quantitative approach was applied using descriptive statistics via a frequency analysis to determine the of teachers' knowledge, facilities, gender in rural areas that applied basically to analyze various household indicators. Inferential statistics such as a T-test and Weighted Average Index (WAI) were applied to determine similarities and differences in perceptions of teachers' salary, length of teaching, the degree of satisfaction of teachers, and dropout in rural areas. Furthermore, Chi-square was employed to test the association of two categorical variables: Teachers' motivation and drop out in rural areas. Qualitative methods were also employed a via collecting interview data from key informants such as school principals, district governor, and governmental officers from MoEYS.



**Figure 3.** Sampling design and procedure

**Table 1***Population and sample*

N	Study Areas	Population	Sample Size	% of Population
1	Prek Dambauk Secondary School	56	32	57.1%
2	Vong Tek Secondary School	34	30	88.2%

### 3. Results and Findings

#### 3.1 Characteristics and working conditions of the teachers

Based on the survey, an average of years of working was 9.3 years; the teachers at the two schools shared similar years of experience (P-Value=0.334). At the two schools, years of teaching from five and below was the higher than between six to ten (1.6%), between eleven to fifteen (11.2%), between sixteen to twenty (12.9%), and between twenty-one and above (3.2%). The years of teachers' working between five and below was the highest rate because the Ministry of Education Youth and Sports innovated and set the policy for the quality of teaching career in order to develop Cambodian educational system that motivate to students who completed bachelor degree and high school even master degree apply for teaching, so a number of recruiting teachers are increasing recently (**Table 2**).

**Table 2***Number of teaching year at the study schools*

Years of working (%)	Prek Dambauk School (n=32)	Vong Tek School (n=30)	Overall (n=62)
5 and below	70.0	66.7	71.0
6 to 10	5.0	3.3	1.6
11 to 15	12.5	10.0	11.3
16 to 20	6.3	18.0	12.9
21 and above	6.3	2.0	3.2
Average (Years)*	9.00	9.70	9.34

Note: \*P-Value=0.334

In Prek Dambauk school, the teachers whose had five years and below of working was (70.0%), between six to ten (5.0%), and between eleven to fifteen (12.5%). The figure was higher than for those who were at Vong Tek school between five and below (66.7%), six to ten (3.3%), and between eleven to fifteen (10.0%). Interestingly, teachers at Prek Dambauk had

years of working twenty-one-year and above (6.3%) was higher than Vong Tek school (2.0%). It means some of older teachers in Prek Dambauk school do not only teach, but also help to do other tasks as much as possible in order to strengthen students' ability and good school environment such the school advisors, committee of teaching, school governance, librarians, and others. But in Vong Tek school (2.0%) was to show some of those teachers were retired, and they didn't have tasks to help in their suitable time like Prek Dambauk school. However, the years of teachers' working in Vong Tek school between sixteen to twenty (18.0%) was higher than Prek Dambauk school (6.3%) because Vong Tek school is near their birthplace, it means that after they completed pedagogical training from Kampong Cham province and National Institute of Education (NIE), they would like to come back to live and work in Vong Tek school near their homeland because they do not want to separate from families and have more spending the money.

In average, teaching hours in Prek Dambauk school and Vong Tek school was sixteen hours per week. Normally, the teachers taught between below sixteen hours (30.6%) was lower than the teachers who had classes above sixteen hours (69.4%). It means the teachers who had more classes than sixteen hours per week taught Mathematics and Khmer literature subjects, and other had to teach another subject in case not enough the teachers. The teachers who taught the students below sixteen hours per week had not enough classes for teaching, and to have many teachers had as same as subjects.

**Table 3***Teaching hours of the respondents*

<b>Attributes (%)</b>	<b>Prek Dambauk School (n=32)</b>	<b>Vong Tek School (n=30)</b>	<b>Overall (n=62)</b>
Below 16 hours	46.9	13.3	30.6
Above 16 hours	53.1	86.7	69.4
Average (Hours)	18.08	21.23	19.60
P-Value=0.00			

According to T-test, there was significant different in teaching hours between Prek Dambauk school and Vong Tek school (P-value =0.00). At Prek Dambauk school, the teachers who taught the students below sixteen hours (46.9%) was higher than Vong Tek school (13.3%) because in Prek Dambauk school had teachers more than Vong Tek school. Moreover, some of the teachers in Prek Dambauk school had as same as subjects, so they had classes less than sixteen hours per week. For example, the teachers of English had classes for both lower and

upper secondary levels were less than sixteen hours per week because Prek Dambauk school exceeded the teachers of English. However, at Vong Tek school, the teachers who had classes above (86.7%) was high than Prek Dambauk school (53.1%), it means that Vong Tek school had not enough teachers, so some of the teachers substituted to teach another subject. For example, History, Geography, and English subjects were substituted to teach by other different teachers such as Khmer and Biology subjects. Although MoYES motivates to recruit the teachers every year, some of schools are still not enough teachers while other schools exceed the teachers. In fact, teachers at Vong Tek school had not enough teachers while Prek Dambauk school exceeded the teachers (**Table 4**).

**Table 4**

*Teaching shifts of the respondents*

<b>Attributes (%)</b>	<b>Prek Dambauk School (n=32)</b>	<b>Vong Tek School (n=30)</b>	<b>Overall (n=62)</b>
Morning	37.5	33.3	35.5
Afternoon	28.1	36.7	32.4
Both	34.4	30.0	32.2
Total	100.0	100.0	100.0
Mean	1.97	1.97	1.97

Based on table 5.4.2 showed that the overall of teachers whose teaching in the morning (35.5%), in the afternoon (32.4%), and both morning and afternoon (32.2%). At Prek Dambauk, school had the teachers whose teaching in the morning (37.5%) and both morning and afternoon were higher than Vong Tek school had the teachers who taught in the morning (33.3%) and both morning and afternoon (30.0%). It means that Prek Dambauk school prepared the schedule to have all of classes of upper-secondary level in the morning and including a few days of a week for both morning and afternoon. Similarly, in Vong Tek school prepared schedule for morning classes for upper-secondary level, but a number of upper-secondary students and classes at Prek Dambauk school were higher than Vong Tek school. However, at Vong Tek school had afternoon classes (36.7%) was higher than Prek Dambauk school (28.1%).

The subjects in secondary schools were divided in two categories which are social subjects and scient subjects. First, the social subjects consisted of (low level) Chemistry, (low level) Physics, (low level) Mathematics, (high level) Khmer literature, (high level) Moral- Civic, Earth-Science, Sport, Economic, History, Geography, Biology, and English. Second, the scient



subjects consisted of (high level) Chemistry, (high level) Physics, (high level) Mathematics, (low level) Khmer literature, (low level) Moral-Civic, Earth-Science, Sport, Economic, History, Geography, Biology, and English. Based on the survey of the overall teachers' teaching subjects in P Prek Dambauk and Vong Tek secondary schools showed that Biology (9.7%), Chemistry (9.7%), English (14.5%), Economic (3.2%), Sport (6.5%), Earth-Science (6.5%), Geography (3.2%), History (4.8%), Moral-Civic(4.8%), Khmer literature (12.9%), Mathematics (13.9%), and Physics (11.3%) (**Table 5**).

**Table 5**

*Teaching subjects of the respondents*

Attributes (%)	Prek Dambauk School (n=32)	Vong Tek School (n=30)	Overall (n=62)
Biology	9.4	10.0	9.7
Chemistry	12.5	6.7	9.7
English	15.6	13.3	14.5
Economic	3.1	3.3	3.2
Sport	6.3	6.7	6.5
Earth-Science	3.1	10.0	6.5
Geography	3.1	3.3	3.2
History	3.1	6.7	4.8
Moral-Civic	6.3	3.3	4.8
Khmer literature	11.5	13.0	11.9
Mathematics	13.5	13.6	13.9
Physic	12.5	10.0	11.3
Total	100.0	100.0	100.0

According to the survey, more than a half (77.4%) of the respondents had other secondary jobs in order to get more supplement income because their teaching salary was not enough to support their living and needs especially to the teachers who have children. Interestingly, the teachers at Vong Tek school (93.3%) had more secondary jobs than those were the teachers at Prek Dambauk school (62.5%). It means that the teachers at Vong Tek school could not rely on their teaching salary, so they really needed the secondary jobs to support their living. Those teachers worked for private classes (66.1), running business (4.8%), and doing farm (14.5%).

At Prek Dambauk school, the teachers had private classes (68.8%) and do business (10.0%) were higher than Vong Tek school, private classes (63.3%) and do business (2.0%) because Prek Dambauk school where located in town to give the teachers have opportunity to teach private and tutoring classes than Vong Tek school. However, at Vong Tek school has the teachers who did farm (20.0%) was higher than Prek Dambauk (9.4%) because Vong Tek school where located far from town that those teachers have rice field to do farm and cropping (Table 6).

**Table 6**

*The secondary jobs obtained by the respondents*

Attribute (%)	Prek Dambauk School (n=32)	Vong Tek School (n=30)	Overall (n=62)
Yes	62.5	93.3	77.4
No	37.5	6.7	22.6
Total	100.0	100.0	100.0
Mean	0.38	0.07	0.23

### 3.2 Reasons of why teachers are changing new working schools

Based on the survey, teachers who never changed schools in both Prek Dambauk school and Vong Tek school were (74.2%), to change for once (9.7%), twice (9.7%), and more than that (9.7%). The reasons that majority of the teachers who never changed workplaces because (1) they are the recruiting teachers, (2) they did not have enough official document and years for change, and (3) their homeland near their workplaces (Table 7 and Table 8). In Vong Tek school had the teachers who never changed workplaces was (83.3%), once (10.0%), and twice (6.7%) were higher than Prek Dambauk school had the teachers who never changed workplaces (65.6%), once (9.4%), and twice (6.3%). It means that Vong Tek school had the teachers who are the most of local people that prefer to live in their homeland, and this school accepted them to work in there. In contrast, in Prek Dambauk school had the teachers who changed workplaces more than two times in order to work there because Prek Dambauk school where located in town that had more challenge for high condition to change and work there. Moreover, Prek Dambauk school allowed to accept the teaches from another school based on any subject was not enough. Based on P-value = 0.028 > 0.005 was not different significant between the teachers in Prek Dambauk school and Vong Tek school never changed school and changed school by their reasons.

**Table 7***Times change of schools by the respondents*

<b>Attribute (%)</b>	<b>Prek Dambauk School (n=32)</b>	<b>Vong Tek School (n=30)</b>	<b>Overall (n=62)</b>
Never change	65.6	83.3	74.2
Once	9.4	10.0	9.7
Twice	6.3	6.7	6.5
Treble	18.8	0.0	9.7
P-Value=0.28	1.78	1.23	1.52

Note: P-value=0.28

**Table 8***Moving from the current working schools by the respondents*

<b>Attribute (%)</b>	<b>Prek Dambauk School (n=32)</b>	<b>Vong Tek School (n=30)</b>	<b>Overall (n=62)</b>
Yes	40.6	26.7	33.9
No	59.4	73.3	66.1
Total	100.0	100.0	100

Main reasons of moving from schools, during the interview 33.9 % of the respondents planned to move from their current schools to other schools, comparatively, in Prek Dambauk school is 40.6% to Vong Tek school is 26.7%. There were many reasons including following spouse (19.4%), away from family (14.5%), isolation from the community (3.2%), and low salary (1.6%). Recently, the Cambodian government was working hard to increase the salary of the teachers at the rural areas. As a result, the salary was not high enough, but many teachers still satisfy. The current salary could support the teachers at rural areas to sustain their living conditions. So, none of the teachers in Vong Tek school had willing to teach at school because of salary. Only the teachers in Prek Dambauk (3.1%) were willing to leave school because of salary. Their main reasons, especially in Prek Dambauk school had willing to follow their families (25.0%), and Vong Tek school had willing to follow their families (16.7%).

Moreover, in Prek Dambauk school had the teachers who from their families (18.9%) was higher than Vong Tek school (10.0%) because a number of teachers in Prek Dambauk school were more than Vong Tek school that some of those teachers were from other provinces, especially the recruiting teachers after they were regarded as the official staff. So those teachers had willingness to change and living in their families. More interestingly, in Vong Tek school

has none of the teachers who feel isolated because most of them were born in there, it means where were their homeland. Further that the teachers who were from another province could live with their relatives and rent houses near school to live together (**Table 9**).

**Table 9**

*Main reasons of moving from the current working school*

Attribute (%)	Prek Dambauk School (n=32)	Vong Tek School (n=30)	Overall (n=62)
Low salary	3.1	0.0	1.6
Follow spouse	25.0	16.7	19.4
Isolate	6.3	0.0	3.2
A way from family	18.8	10.0	14.5
Total	40.6	26.7	33.9

### **3.3 Teachers' satisfaction towards motivations and retentions**

Weight Average Index was used to draw perception of interviewed teachers' toward working and living conditions in schools, T-test was also used to see the teachers' perceptions of both secondary schools which Prek Dambauk and Vong Tek had different perceptions regarding the proportion and contribution. Overall the teachers had high satisfaction regarding to living and teaching conditions that excepted their rates were high satisfaction regarding living comfortable, food, water, electricity, health service, security, and building capacity. T-test revealed that the perceptions of the teachers at Prek Dambauk and Vong Tek schools had different views regarding to scholarship and distance of traveling. T-test analysis shows different significant satisfaction between the teachers' perceptions of scholarship in Prek Dambauk school and Vong Tek school (P-value=0.02). In Prek Dambauk school had the teachers who did not satisfy for the scholarship for study because they were old and tired to travel studying at Phnom Penh which was far from their living places. In addition, those teachers in this school were busy with their secondary jobs. In contrast, the teachers in Vong Tek school which located nearer Phnom Penh than Prek Dambauk school had satisfaction to continue their study in Phnom Penh because they spend short time for travelling (**Table 10**).

**Table 10***Perception towards working and living conditions*

Attribute	PrekDambauk		VongtTek		Overall		P-value
	School		School				
	(n=32)		(n=30)		(n=60)		
	WAI	OA	WAI	OA	WAI	OA	
Building capacity	0.66	H	0.62	H	0.65	H	0.25
Scholarship	0.58	M	0.62	H	0.60	M	0.02
Security	0.69	H	0.70	H	0.70	H	0.74
Comfortable living	0.70	H	0.71	H	0.70	H	0.87
Distance of travelling	0.65	H	0.54	M	0.60	M	0.04
Road condition	0.55	M	0.43	M	0.50	M	0.01
Health service	0.65	H	0.64	H	0.65	H	0.76
Water	0.68	H	0.66	H	0.68	H	0.52
Food	0.66	H	0.64	H	0.65	H	0.44
Electricity	0.65	H	0.69	H	0.67	H	0.27

Note: WAI= Average Index measured on a five-scale [ considerably Very High(H)=0.81-1, High(H)=0.61-0.80 Moderate(M)=0.41-0.60, Low(L)=0.21-0.40, Very low(L)=0.00-0.20

However, T-test analysis shows different significant satisfaction distance of travelling between Prek Dambauk school and Vong Tek school (P-value = 0.04). The teachers in Vong Tek school were not satisfied with distance of travelling because they met difficulty to go to school. It means that some of the teachers lived far from this school that they spend much time for travelling. The teachers in Prek Dambauk school had satisfaction of distance of travelling because this school located in town, and most of the teachers lived near this school. So they spent short time for their travelling. Interestingly, the overall of teachers in both Prek Dambauk school and Vong Tek school did not satisfy with road conditions. Based on P-value = 0.01 was different significant, and they had moderate rate of road conditions. In raining season, those roads were slide and shake and dust in drying season. In fact, those some of teachers and students live far from their schools met difficulties for their travelling. For example, when it had raining, those roads were so slide and mud that made both teachers and students could not go to schools. So, they wasted time for their teaching and learning because of the terrible roads.

Perception toward motivation incentive, the weight average index was used to draw perception of interviewed teachers regarding to motivation and incentive that provided by the schools, T-test was also used to see the teachers' perceptions of both schools which Prek Dambauk school and Vong Tek school had different perceptions regarding the proportion and contribution (**Table 11**). Overall the teachers had high satisfaction regarding motivation and

incentive excepted their rates are moderate satisfaction regarding scholarship and teaching material. T-test revealed that the perceptions of the teachers at Prek Dambauk school and Vong Tek school had different views regarding to salary, incentive, and social recognition. The perception of overall of the teachers in both Prek Dambauk school and Vong Tek school had the same views of high satisfaction regarding to teaching hours, teaching classes, workloads, family support, and school facilities. Interestingly, T-test showed that the perception of the teachers in Prek Dambauk school and Vong Tek school had the same view of moderate perception regarding to accommodations which means that the teaches came from others schools that taught in both schools need suitable homes or accommodations for staying near their working places.

In addition, the teachers' perceptions in Prek Dambauk school and Vong Tek had different views of students' behavior. The teachers in Prek Dambauk school had high satisfaction of students' behavior because those students had willingness to study and respect to the teachers. In contrast, the teachers in Vong Tek school had moderate satisfaction of students' behavior because those students did not have willingness to study and not good respecting to the teachers.

**Table 11***Perception toward motivations*

Attribute (%)	Prek Dambauk School (n=32)		Vong Tek School (n=30)		Overall (n=60)		P-value
	WAI	OA	WAI	OA	WAI	OA	
Salary	0.67	H	0.61	H	0.65	H	0.07
Incentive	0.66	H	0.62	H	0.65	H	0.07
Social recognition	0.65	H	0.73	H	0.69	H	0.05
Accommodations	0.59	M	0.57	M	0.58	M	0.59
School facilities	0.63	H	0.65	H	0.65	H	0.68
School leadership	0.58	M	0.57	M	0.58	M	0.83
Administrations	0.68	H	0.64	H	0.67	H	0.29
Teaching hours	0.68	H	0.67	H	0.67	H	0.97

Teaching classes	0.67	H	0.70	H	0.69	H	0.45
Teaching material	0.60	M	0.58	M	0.59	M	0.47
Students' behavior	0.63	H	0.60	M	0.62	H	0.04
Workloads	0.73	H	0.74	H	0.74	H	0.68
Family support	0.65	H	0.67	H	0.66	H	0.44

Note: WAI= Average Index measured on a five-scale [ considerably Very High(H)=0.81-1, High(H)=0.61-0.80 Moderate(M)=0.41-0.60, Low(L)=0.21-0.40, Very low(L)=0.00-0.20

#### 4. Conclusion

Based on the result of research find of teachers' motivation and retention in rural areas to draw the teachers' perceptions and needs in their teaching and living conditions in both Prek Dambauk Secondary School and Vong Tek Secondary School located in Srey Santhor district, Kampong Cham province. First, most of the teachers demanded to improve their teaching career such good enough salary, teaching material, school buildings, and suitable teaching workload. It means that the teachers' current salary was not enough for supporting their living because those teachers needed to spend the money for their children, food, equipment, bill, and including treatment. Especially, the recruiting teachers who were from another province to teach in both secondary schools needed to spend more money on rent houses for staying. So, the teachers made decision to have the second jobs like to do farm, run business, teach private classes, and tutoring in order to have supplement income to support their living.

According to the research finding result of the perceptions of the teachers in Prek Dambauk Secondary School and Vong Tek Secondary School that those of teachers concerned to their teaching salary, living condition, and the situations of their teaching career. In Prek Dambauk school had a number of teachers were more than Vong Tek school because Prek Dambauk school located in town, and the teachers had comfortable living such as food, staying, material, and security unlike Vong Tek school located far from town that were not comfortable living for the teachers especially, for the new recruiting teachers who were from other places to work there. In addition, in Prek Dambauk school exceed a number of the teachers worked in Prek Dambauk school while Vong Tek school still had not enough the teachers to work there. Some of the teachers in Prek Dambauk school taught not enough hours, but still simply got salary.

In contrast, Vong Tek school had some of the teachers taught exceed hours of teaching because this school had not enough teachers that one teacher could teach two subjects as much as possible. Although the teachers in Vong Tek school had more working hard in teaching, they were motivated to get the extra money for their teaching sections. Based on the survey of interviewing the teachers, in Vong Tek school had more teachers who were appreciated their teaching career than the teachers who in Prek Dambauk school. Although Vong Tek school located in rural area, the teachers in Vong Tek school were get more incentive for their teaching sections, and they could save money. On the other hand, the teachers in Prek Dambauk school had not get incentive of teaching sections, and some of them still concerned about their basic salary that was not enough to support their needs. More interestingly, a number of teachers changed from Prek Dambauk school to live with their families in other places were more than Vong Tek school because Prek Dambauk school had more of the recruiting teachers from other places. When the those recruiting teachers in Prek Dambauk school were regarded as the official staff and had enough document and criterial for changing, they could change from Prek Dambauk school to live their hometown. In short, both schools still faced up the various problems such not balancing the numbers of teachers, workloads, living conditions, and salary.

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Ministry of Education, Youth and Sport

Department of Policy

*Article*

## **Factors Influencing Students' Choice for Science and Social Science Stream: A Case Study at Upper Secondary Schools**

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Received: June, 2021/ Accepted: August, 2021

### **Abstract**

This research was conducted to explore the factors influencing science and social science stream choices at the upper secondary schools in Cambodia. The study uses semi-structured interview guide to gain the insightful understanding on the factor affecting the stream choices. There are 25 respondents participated in the study through phone interview including school principals, teachers and students in both science and social science stream. The results reveal that there are some critical factors influencing the stream choices such as student factor, family factor, school factor, and other factors including social, economic, friends, university subject and job market. However, there is a concern of failing the grade 12 examination which show the gap between the level of test and students' ability. This trend also indicated the noticeable decrease of science stream choice. Thus, it should be considered on the revision of curriculum design and national examination in both streams, strengthen the student achievement, and provide insightful orientation and motivation from all relevant stakeholders to the students in both streams.

**Keywords:** Cambodia, Science stream, social science stream, upper secondary schools, STEM

**To cite this article:** Seang, L., Chey, R., Souk, S., Hak, M., & Ob, B. (2021). Factors Influencing Students' Choice for Science and Social Science Stream: A case study at Upper Secondary Schools. *Cambodia Education Review*, 4(2), 87-98.

## 1. Introduction

The Royal Government of Cambodia (RGC) has set the Industrial Development Policy (IDP) 2021-2025 which plays an important role to develop Cambodia from lower middle-income country to upper middle-income country by 2030 and to become a develop country by 2050 (Council of Ministers, 2015). Within this ambition, Cambodian has put its great efforts and commitment to shift the country from agriculture-based society to industrial based society. To achieve this vision, it has been placed a great emphasize on the education of Science, Technology, Engineering, and Mathematics (STEM) in promoting national economic as well as human resource development as mentioned in the National Strategic Development Plan (NSDP) 2019 (MoP, 2019). In line with the government's vision and goal, the Ministry of Education, Youth and Sport (MoEYS) has formulated the new generation school policy (NGS) and STEM in 2016 (MoEYS, 2016a, 2016b). These policies were created to promote the education quality in the field of science and to attract more and more students to choose science as a major in the upper secondary schools, especially to continue their study at higher education in STEM major related field. To support the national policy, the Asia Development Bank (ADB) established a five-year project entitled "Upper Secondary Education Sector Development Program II" (USESDP-II) which start from 2020 to 2024 to provide financial and technical support in order to promote education service at upper secondary schools. As mentioned earlier, although the RoGC, MoEYS and ADB have promoting STEM, it has been found that a large proportion of students have increasingly opted for the social science to science stream over the past years at the upper secondary level. The enrollment rate in science stream sharply fell from 94.30% in 2014 to only 38.60% in 2020, whereas the enrollment rate in social science stream significantly increased from 5.70% in 2014 to 61.40% in 2020 (MoEYS, 2020a). Due to a significant decrease of enrollment rate in science stream, the present study is deemed as a crucial mean to rigorously investigate and explain in-depth on what might be the main reasons pushing more students to choose social science stream at the upper secondary level.

Recently, several studies (Kinyota, 2013; Kao & Shimizu, 2019) have investigated factors affecting major choices at higher education. However, these studies focused on only students and the downtrend of STEM- related major choices at higher education. Additionally, only a quantitative approach was employed (see Kao, 2020; Kao & Shimizu, 2020; Sovansophal, 2019; Sovansophal & Kinya, 2020; Sovansophal & Shimizu, 2019). Meanwhile, the current study will specifically focus on factors leading students who choose social science stream

rather than science stream. The results will provide a clear insight into the root causes of a sharp decrease in science-stream enrollment rate to the RGC, MoEYS and especially ADB to find appropriate immediate and future interventions and policy options to attract more students to choose science stream. Moreover, this study aims to explore the factors influencing science and social science stream choices at the upper secondary schools in Cambodia from the different perspective and lead to the way forward to deal with those factors.

## 2. Literature review

The initiative of STEM promotion is the strong effort of the government in producing the human resources in the purpose of transforming Cambodia from agriculture-based country to industry-based country. This has made the flow of education in Cambodia particularly upper secondary education (grade 10 and 12) into two main streams– science stream and social science stream. The students are required to choose the science stream or social science stream in grade 10 and enroll in the class they choose in grade 11. However, they are allowed to change their stream choice when they are in grade 12. The students in both streams are required to study the same subjects. The difference between the two streams are the number of hours in each subject. The science stream students are required to study more hours on science subjects rather than social science subjects while social science stream students are required to study more hours on social science subjects rather than science subjects (MoEYS, 2010).

In addition, various studies (Kinyota, 2013; Kao & Shimizu, 2019) both in the globe and region were found that there are many factors influencing science and social science stream choice in upper secondary education. The study found that male students and female students tend to choose different jobs in their life. The exiting studies (Paik & Shim, 2012, Kinyato, 2013, Li & Kuan, 2018, Buser, Peter & Wolter, 2017) indicates that the gender of the students affected between science stream choice and social science stream choice. In contrast, Paik & Shim (2012) shows that stream choice in upper secondary school revealed that there are 51.1% chances of female students choosing social science stream compared to male students. Similarly, Kinyato (2013) found female students in general did not get a good grade in national examination leading most of them choosing the social science stream compare to male students. In contrast, the study in Cambodia revealed that gender does not affect to the science stream choice. The study indicated that choosing science stream does not have a strong relation with their skill and job in the future (Kao & Shimizu, 2020). Moreover, the study in Taiwan show that female students tend to study science stream and they decided to choose science because they are good at mathematic (Li& Kuan, 2018).

Furthermore, the student's preference also affected to the stream choice in upper secondary school. The study indicated that the students who like to study language and social studies tend to choose social science stream while the students who like to study math and science tend to choose science stream (Paik & Shim, 2012). This was shown similarly to Cambodian context where the students who are interested in science subjects tend to choose science stream (Kao & Shimizu, 2020).

In addition to the student factor, family factors such as parents' qualification (Arslan, 2016; Dustmann, 2004), socio-economic status of the family (Arslan, 2016; Vallejo; 2019, Resh, 1998), motivation and encouragement from family (Kao & Shimizu, 2019) influenced to the student stream choice. Moreover, school factor such as school location (Kao & Shimizu, 2020; Paik & Shim, 2012), school size (Paik & Shim, 2012), and school resources are also found to have an effect on student stream choice.

### **3. Research method**

To deeply understand the reasons behind the decreasing of science stream choice, the insightful information from students of the two streams, teachers, and school principals are very important in finding out the reasons why the students choose each stream for their national examination of grade 12 in upper secondary school in Cambodia. Therefore, this study was conducted using a qualitative case study to have an in-depth understanding with the key informants such as school principals, teachers, and students from both science and social science stream. According to Creswell and Poth (2018), a qualitative case study can develop an in-depth description and analysis of a case. Therefore, it is suitable to use this study approach in this research.

The study was conducted at five different provinces such as Batambang, Koh Kong, Kampong Cham, Mondulkiri, and Preah Vihear. The samples were purposively selected from those provinces which located in the geographical scope of the mountainous area, central plain area, coastal area and highland area of the country. One upper secondary school from each province was purposively selected to be a sample size. In total, there are five upper secondary schools selected for this study.

In each school, there were one school principal, two teachers—one science teacher and one social science teacher, two students (one from science class and another from social science class) participated in the interview. Therefore, there are five participants from each school and 25 participants in total participated in this study.

This study employed semi-structured interview guide which divided into different categories. The open-ended questions are used differently among school principals, teachers, and students. There are 7, 10, and 12 open-ended questions for school principals, teachers, and students respectively which mainly focus on the support, perspective and action to promote science stream choice. All the questions were developed based on the document analysis particularly the decrease in science-stream enrollment which lead to understand on the support, reasons, and perspective as a whole from relevant stakeholders. Moreover, all the questions were piloted in one province where students, teachers, and school principal participated to check whether they were understandable and valid for the study. After piloting, the questions were checked and modified to get fully understanding and be applicable.

The school principals were interviewed to understand deeply about their perspective and support on students' stream choices while teachers were asked about their support, perspective, and their action to promote science stream choice. In addition, in the interview, students were asked to give the reasons why they choose each stream, their understanding on the two streams, and support from relevant stakeholders in choosing the stream. The answers from the three different group of participants were transcribed and analyzed using thematic analysis.

Due to the spread of Covid-19, the data collection was not be able to conduct on face-to-face and instead it was conducted via one-on-one phone interview which took around 30 minutes for each participant. The researcher got the ethical approval from MoEYS before data collection. It took five days to complete the data collection process which started from 20<sup>th</sup> to 24<sup>th</sup> of September, 2021. During the interview, the researcher also asked the permission from the participants to record the answer in the purpose of rechecking and transcribing the data.

According to Creswell and Poth (2018), the data analysis and representation are different among the study approaches. So, for this study, the researcher recorded the data from each participant, transcribed, and put it in the categories. The data were organized in the text form, make a marginal note and using the note to form the codes. The codes were made from the content of the questions in each category and use the categorical codes to establish the themes and finally made a direct interpretation.

## **4. Results and findings**

### **4.1 Student factors influencing choice for science and social science streams**

According to the interview result with students, it indicates that the students from both science and social science class decided to choose the science stream or social science stream

based on their preference and capacity. In this sense, the science students choose the science stream because they like and they are good at those science subject such as mathematics, physics, chemistry, biology and so on. They do not really like the subjects which required them to read a lot or memorize such as geography, history etc. On the other hand, social science student decided to choose social science stream because they love those subjects and they are not good at mathematics. In fact, they clearly show in the following comments:

*I choose science stream because I love those subjects and easy to learn than social science subjects. (SS 01,02, &05)*

*I choose social science stream not because of my friends or others but based on my preference and my ability and avoiding wrong decision, wasting time and could not catch up the lesson. (SSS 02)*

Additionally, the finding from the teachers of the two streams reveal the similarity with the students' answer. They focus on the support and some advices for choosing the stream based on the students' ability, preference and their future goal. Moreover, a few science teachers also mention about the students' decision. In the past, there were some students change their class from science stream to social science stream because of their ability. They afraid that they could not pass the national exam [Pers.Comm. SST]

*Before making the decision on which stream they choose, the students should consider on their ability, preference, and their goal by focusing on their future career. (ST 03&05, SST 05)*

*There are a few students who ask for changing from science to social science class due to afraid of failing the exam and the poor ability. (ST 03)*

Meanwhile, most of the school principals show their support by giving instruction, advice as well as consultation with the students before they make a decision on choosing each stream. From the school principals' perspective, students choose whether science or social science stream based on their tendency, preference, ability, and knowledge of each student on the subjects [Pers. Comm. SP]

*[...] Before choosing the streams, the school principal gives an instruction, orientation, information sheet which approved by parents and giving additional explanation to students. (SP 02 &05)*

*The students choose science or social science stream depending on themselves, their tendency, preference and their own ability. (SP 01&03)*

#### **4.2 Family factors influencing students' choice for science and social science streams**



The interview results with students reveal that both students from science and social science class decided to choose science or social science stream because they got some advices and encouragement from their parents and other relatives in their family. However, most of the parents did not make a decision for their children instead they agree and follow their children's decision. They want their children learn by their own and using their ability because they are so busy with their work. Nonetheless, there are a few parents pay more attention on their children's study through communicating with teachers and school principal [Pers.Comm. SS].

*I choose science stream because my parents want me to be a doctor in the future. Moreover, studying science give me more opportunities to find jobs. They also encourage me to study science due to I am good at science rather than memorized subject. (SS 02 & 04).*

Related to this matter, the teachers also mention as following:

*The students choose science stream by discussing with their parents as well as supporting from their family. (ST 02 & 03)*

*The students choose social science stream because of their family income which they cannot support them for private class. (SST 02 & 03)*

*The students choose social science stream because their parents want them to have a skill and have a job as they want their children do. (SST 04)*

The school principals also mention similarly with the teachers. They said that students choose either science class or social science class by filling the information form which acknowledge by their parents. Students choose social science class because of the encouragement from their parents. The students change their class because of their parents and relatives.

#### **4.3 School factors influencing students' choice for science and social science streams**

After getting the answer from the students, both science students and social science students have many opportunities to receive the thorough information on choosing the streams based on their preferences. They also receive that information before making a decision [Pers.comm. SSS]

*[...] the school provide the information to students related each stream with the number of study hour. (SSS & SS 01,02, 03, 04, & 05)*

There are similar answers between teachers and school principals which show the information provided by school. The school principals broadly disseminated the information related the division of the two main streams. The teachers also encourage and explain the students to choose the stream and avoid the feeling of failing the exam [Pers.Comm. SP]

*[....] the school principals explain about the importance of each subject before making a decision and check the students' examination result with clearly explanation on the opportunity of finding a good job. (SP02 &03)*

#### **4.4 Other factors influencing students' choice for science and social science streams**

In addition to student, family, and school factor, it has been found that other factors such as future goal, job opportunities, and social factor also affect to the students' choices in choosing the two streams. In fact, according to the interview result, both students from science and social science class choose the stream because of the relevance between the subject they are studying with the subject they want to study in the university. Those subjects are civil engineering, electric engineering, doctor, biology teacher and so on. They choose the stream because there are many job opportunities related the subject, high salary, and the needs of those subjects in the society. Similarly, to the social science students, they choose the stream because they want to continue their study the field, they love in the university within the good opportunity in finding job as well as to deal with social problem they have faced in the present day [Pers. Comm. SS, SSS]

*I choose science class because it is relevant to the skill that I want to continue in the university, I can earn a lot of money, the job I love need science subjects, and the people in my village need someone who has high knowledge in science. (SS 01, 02, 03 &04)*

*I choose social science class because I want to promote our nation, help society, protect poor people and the ones who are vulnerable. (SSS 01, 03 &04)*

Another finding from teachers' perspective, they think that students choose either science or social science stream because of their friend and job market. They also change their class because of their friends.

*The students choose either science or social science stream due to they see the opportunity of job market through observation on their relatives' job and also follow their friends. (SST 02, 04, 05 and ST 01, 02, 03 &05)*

*Some students change their stream based on their friends and they think that passing grade 12 exam is important no matter science or social science. It easy to find a job and continue their study in the private university. (ST 02, 04 and SST 02)*

The school principals also agree that the factors influencing on students' decision are social factor, economic factor and friends.

*The students choose either science or social science due to social factor, economic, and follow their friend because they do not know which subject, they are good at. (SP 01 & 02)*

## 5. Discussions and conclusion

This study has clearly shown the factors influencing student science stream choice and social science stream choice through having an in-dept interview from the relevant stakeholders. Based on the interview result, the social science students often come from the group of weak learning students, they are afraid of failing the national exam so they tend to choose social science stream which offer them a good opportunity to pass the national examination. They also do not need to spend much money on private tutoring like science stream student. Moreover, the students choose the stream based on their own preference. This result is consistent with the study done by Kao & Shimizu (2020).

Moreover, family factors such as providing an advice to children on their stream choice, family expectation and family standard of living are also driving force for students to choose social science stream. This result intertwines with previous studies such as Kao & Shimizu (2020) and Kinyota (2013).

The result of school factor reveals that teacher's explanation on each subject and stream, and the school guideline before student making a decision also influence the stream choice. Teachers are the ones who stay very closed to students, know their students' performance very well and always stay connected with students to push them to understand the guideline, importance of each stream and help orient them to their dream job by motivate them to choose stream they are interested. This result is in line with the result indicated by Kao and Shimizu (2019).

Promoting national economic and human resource development is the goal of national development agenda which required all relevant stakeholders to pay more attention on education system particularly on STEM education. When the students have a strong basic related STEM major, there will be an increase of possibilities in industrial activities which is a

crucial part of country development. The result of the study indicated that the individual student, family, school and other factors are the driving force to encourage students to enroll in science stream. Therefore, the study has some reflections and suggestions for policy implication as follows.

**Curriculum design and national examination.** MoEYS should consider on revision of curriculum design between science and social science stream especially the national examination. MoEYS should consider on adding some subjects to the national examination and strengthen the test level in order to encourage students to keep studying and working hard on all subjects.

**Strengthening student achievement.** The individual factor refers to the capacity, self-confident and attitude in science and mathematics are very intertwined in science stream choice. Thus, the student achievement strengthening on mathematics and sciences should be included in the priority action plan to increase the science stream participation. Based on teacher interview, the student self-confident reinforcement on their science abilities should be given more attention by all relevant stakeholders because some students show their positive attitude toward science subjects but they are not confident on their ability that is the reason motivating them to choose social science instead of science stream.

**Orientation and motivation.** The motivation from people around such as teachers, school principals, friends, especially parents play an important role in science stream choice as indicated in the result of this study. Therefore, the insightful explanation and orientation on each stream as well as the encouragement from parents and teachers are needed to strengthen the students' learning and possibly attract the students' attention to choose science stream particularly the ones who are good at STEM.

There are some critical factors affecting the science and social science stream choices at Cambodian upper secondary schools. Those factors are student factor, family factor, school factor, and other factors including social, economic, friends, university subject and job market. The student factor refers to the students' ability and preference in choosing the stream which show the strong relevance to the teachers and school principals who provide the support and encouragement to students in choosing each stream. However, there is a concern of failing the grade 12 examination which show the gap between the level of test and students' ability. This trend also indicated the noticeable decrease of science stream choice. Moreover, the exclusion

of some exam subjects has made students not to pay attention to those subjects in school. For example, social science students do not take an exam on science subjects and vice versa.

The main limitation of this study is that it failed to capture the perspective of students' parents both from science and social science stream. This is because the author wanted to hear the opinion from the school level including school principals, teachers, and students. To get rich of information from every angle, the key informant interview with parents should be done.

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