

# Studying abroad: Experiences of Bhutanese IT Engineering Student

Kuenzang Choden  
*Information Technology Department  
College of Science and Technology  
Royal University of Bhutan  
Phuntsholing, Bhutan  
kuenzangc807@gmail.com*

Jiecong YANG  
*Department of Information Technology  
Uppsala University  
Uppsala, Sweden  
jiecongyang@outlook.com*

Sangay Wangdi  
*Information Technology Department  
College of Science and Technology  
Royal University of Bhutan  
Phuntsholing, Bhutan  
wangdisangay00@gmail.com*

Anders Berglund  
*Uppsala Computing Education Research Group, UpCERG  
Dept of IT, Uppsala University  
Uppsala, Sweden  
Anders.Berglund@it.uu.se*

**Abstract**—This work-in-progress research discusses the impacts of the student exchange program on Bhutanese Information Technology exchange students. Student exchanges are common among various academic institutions to enhance competency, collaboration, and cultural exchange. For example, an exchange program between the College of Science and Technology, Royal University of Bhutan, Bhutan, a young developing institution, and Uppsala University, Sweden, an old, established university, has witnessed successful bilateral partnerships since 2016. Both partners see the exchange program as fruitful. However, the researchers have not yet researched the outcome of the program on the students. Therefore, in this case study, we study and discuss the influence of the exchange program on the Bhutanese exchange students in this paper. We collected the data from several semi-structured interviews and analyzed the transcripts qualitatively. We asked each student five guiding questions and several follow-up questions. The responses were discussed and jointly investigated by the three first authors. We concluded that studying abroad helps the students to develop in many fields. In this paper, we describe their general experiences, challenges, and growth as perceived by them. Furthermore, the study revealed how the differences between the environments proved to be constructive for the students, as the program contributed to the growth of students, including skills and knowledge.

**Index Terms**—exchange program, semi-structured interview, exchange experiences, changes, learning environment

## I. INTRODUCTION

Numerous universities engage in exchange programs with other universities worldwide as a method to develop globally competent professionals [1]. The exchange partnership between the Uppsala University (UU), Uppsala, Sweden and the Royal University of Bhutan (RUB), Bhutan engineering students within IT aims for the same. According to Berglund et al. [2], the exchange partnership between asymmetric partners can prove to be productive as the differences allow the partners to gain new insights, collaborate and act innovatively.

This research aims to understand the actual experiences and the outcome of Bhutanese IT engineering students studying abroad.

## II. BACKGROUND

The College of Science and Technology (CST) of RUB offers nine programs, of which Bachelor of Engineering in Information Technology (B. E. IT) is one [3]. The college considers exchange programs an essential activity contributing towards academic and research growth among the students. CST has been one of the successful colleges in Bhutan since 2009 in maintaining EU funded exchange partnership with various European universities, of which the most active is with Uppsala University. Through this partnership, seven Bhutanese IT engineering students at the Bachelor level have completed their exchange studies for one semester in Sweden.

Uppsala University is the oldest university in northern Europe. It is a comprehensive university, offering a wide range of courses that are not limited to core computer science. The Department of Information Technology offers 14 programs, and over 150 courses offerings per academic year, and over 100 teachers and researchers [4]. Both the institutes follow ACM/IEEE curriculum [2].

This paper focuses on the experiences of seven students, who studied at UU as exchange students for five months in autumn semesters, three students in 2016 and four students 2019. They could select any course (irrespective of their presence in the home university) offered by the Department of IT, UU. The students completed their third year in Bhutan before leaving for Sweden and were not used to studying in an international setting. For them, UU, as well as Sweden, was new.

### III. RELATED WORK

An autoethnographic study by Berglund et al. [5] presented the transformation in understanding research for two Bhutanese exchange students. They aimed to “make the students’ experiences and transformations available for others (such as other students, teachers, and administrative staff at universities) to learn from and to reflect upon”(p. 98). Exchange programs help students and teachers build their globally competent skills [1] and enhance adolescents’ cognition of different cultures [6]. Swiss students with experience of studying abroad had a higher possibility of opting for postgraduate studies [7].

Blumenthal et al. [1] discuss the importance of exchange programmes for the development of engineering students’ global competence. Only about 3 percent of the students studying abroad were engineering students. From their findings, the importance of exchange among STEM and engineering students has grown since soft skills have been regarded as a requirement in engineers. The challenges and strategies of Germany and the USA are covered in this study. With increasing understanding among partners, they can modify the course structure to benefit both the students and the nations. Exchange programs are considered as a technique for peacebuilding in research by Olberding et al. [6]. The program’s impacts are examined using a 360- degree feedback method that collects data from the indirect participants (people involved with the exchange students). The study’s primary focus is on youth peacebuilding, and they discover that the beneficial effects observed were seen more in indirect participants, resulting in a ripple effect. Our study focuses on the students’ expression of their experiences and collects data directly from the participants. The communicative competencies and usage of ICT among exchange students were studied by Gomez et al. [8].

### IV. RESEARCH METHODOLOGY

This research aims to find the experiences and understand the transformation of the students in the field of Computer Science. It considers the change in students’ skills as an outcome. It intends to comprehend them while simultaneously finding out about their extracurricular activities and recognize their involvement in a different culture.

Dearnley [9] points out that participants’ accounts of their experiences were the primary source of data. In light of the corona pandemic, a semi-structured text interview was conducted using the Messenger application with all interviewees, and the researchers were distributed over three continents. The interviews conducted on Messenger could reflect the emotions of the interviewees through the use of emoticons and onomatopoeia [10]. Still, it could not capture the feelings to the full extent of in-person interviews. The Bhutanese students studying in an English-medium school make the interviewees equipped to share their views in English. Moreover, we felt that texting over speaking gave the interviewee the time and space to think and share their thoughts with a choice of more appropriate words.

#### A. Data collection

The first three authors interviewed the seven IT exchange students who have been to UU so far. All the data from the interviewees were collected using the Messenger application. We asked five lead questions:

- What are your experiences at UU?
- What new IT skills did you gain?
- Did you face any difficulties?
- What were some of the extra-curricular activities you could take part in?
- How do you think studying at UU has changed your confidence?

Some of them answered in detail, while others kept their answers short. Depending on their responses, we asked them some follow-up questions. Each interview took about an hour or two. After every interview, the answers were collected, formatted in a google doc, and then shared among the authors to be analyzed collaboratively in a readable and understandable form.

#### B. Data Analysis

The collected data was thoroughly read before it was analysed to check for some missing data necessary for the research. Another interview was conducted in the same manner as the previous interview to ask the various respondents some additional follow-up questions to supplement selected responses for precise analysis. A practice also suggested by Opdenakker [10]. From the answers, key points common and relevant to the questions were identified. The responses from each interviewee for a particular topic were structured in a tabular form and further analysed. The simultaneous analysis of each response for a topic made it possible for us to recognise the implicit answers. At the same time, we counted the frequency of the key responses aided to understand their significance. The analysis was reviewed to avoid missing any important points. Eventually, an understanding developed from the responses is reflected in the result categorisation as General experiences, IT skills, Challenges and Confidence.

### V. RESULT AND DISCUSSION

The study of experiences and the analysis led to the following insights. Our interpretations are based on our interpretations of what the seven students expressed.

#### A. General Experiences

1) *Academic:* From the experiences shared by the Bhutanese students, UU was an international academic setting. Bhutanese students described UU students as more independent and open in interaction, asking questions or raising concerns for their lecturers than the Bhutanese students. The students could learn from the new multicultural environment.

Yalden<sup>1</sup> shared, “In some courses, most of the time we had to work in groups with smarter students, and we could learn from them.”

<sup>1</sup>To preserve the anonymity of the students, their real names are replaced. Further, the pronoun “she” and “her” are used for all students, male as well as female

Thomson said: “In programming, lecturers teach [in Uppsala] only the theory concept and not the basics of programming languages like in our country. Students have to explore and do it on their own”

The interviewees explicitly mentioned “more student effort” or used other similar terms centralizing self-explorative UU students. A change in their learning style was seen as an adaptation to this new environment. The students reflected that the change in their learning style was also a result of the assessment method of the lecturers.

Kennedy shared, “The course was assignment oriented. I had to write coding in the assignment as well as during practical sessions, which in a way helped me to find myself.”

Smith responded, “Before, I never used to browse YouTube videos for learning, but after reaching there, I used that to level up my skills. It became one of my study methods.”

The favourability of the learning environment was further enabled by the internet accessibility and speed on the campus. Learning openly from the resources on the internet and not relying entirely on the lecture notes became a part of their learning habit. Moreover, the students experienced an equal student-professor relationship at UU.

Peterson uttered, “[...] me being from Bhutan, I had a culture of calling professors’ sir’. Later, I got adapted to addressing them by their names.”

The student and professor show equal effort in learning. Gómez [8] stated that the improvement in communication skills and use of internet resources in exchange students are seen notably. Their result discussed that the students realize the importance of the internet as a source of information. Our finding orients with theirs as the Bhutanese exchange students agreed to use the internet resource for learning course-related materials and beyond.

2) *Extracurricular activities:* During their stay, the students travelled and toured Europe and experienced different modern transportation systems not available in Bhutan. The students also shared about exposure to new cultures.

Graham mentioned, “Experiencing their culture is also interesting. I have been to the north, and I even experienced the culture of the Sami people. Even in international Gasque, they sing lots of old songs before they drink and eat. Those were wonderful experiences I had over there.”

The interviewees mentioned the activities, mostly socializing, organized by the student clubs that helped enrich the interaction. The Bhutanese students expressed astonishment towards the student clubs being fully managed by the students.

Graham responded, “Interacting with people is the first thing, knowledge is another, and enjoyment is the main thing I could gain”.

Llewellyn-Smith and McCabe [11] found out that the host destination factors related to travel, social interaction and fun have an inducement to students undertaking an exchange program. Moreover, the respondents shared their travelling experiences when probed to share any other experiences though it was not specifically included in the question. The enjoyment

and the lessons learnt from the trips and tours taken by the students seem to be imbibed in their minds.

### *B. IT skills gained*

With exposure to new subjects and a new learning style, they discovered interests and skills. Thomson said, “I realized the basics I had been missing. Particularly, I learned the importance of basics, be it programming or the manner in which you carry out research”. Some Bhutanese IT students don’t have a habit of accessing the internet and are beginners with no prior experience in programming [12]. Improvement in the programming and coding skills was a significant change seen in them.

Yalden answered, “I was not really interested in coding before I got to study at UU. After joining UU, I was driven by the skilled coders there and got more interested in coding than before (software testing module).”

Few who were not into programming were challenged to learn for the course they took. The need to self-learn for assignments or practicals was initially a compulsion, but they gradually developed an interest.

Some realized and expressed that they missed the basics of programming. The interviewees mentioned that they gained IT skills from the courses like artificial intelligence, data mining, software development, database, and real-time application. These courses made them learn something that they could not have in their home university due to the absence of the course or lack of depth if present. Specifically, Computing Education Research, as shared by students, enhanced their knowledge on research.

Peterson narrated, “Firstly, before coming to Uppsala, I had no idea what research was. Never knew how and for what research was done. After studying at UU, I could understand research. And this skill has helped me write five papers which were published in various IEEE conferences in the last few years.”

The students learned from the project they did for their course. Some students could publish their papers in international conferences, and the exposure motivated them to learn more and become more confident. While some had a whole new learning experience, for some, it was further knowing and comprehending what they already knew.

### *C. Challenge faced and their impacts*

Moving to a new environment, the interviewees faced issues that were or were not related to their studies. Difficulty adjusting to the food, climate, and classroom environment was a common issue faced by all. Unlike other students, Bhutanese students were not open at first. The courses they were taking were challenging to them.

Smith answered, “I took one course called Real-time system where I had to sit among master students and learn. It was very difficult for me to go in line with them.” The course in UU can be taken by both Undergrad and Masters students. The students were intimidated when they could not catch up to the average pace of the class.

Smith said, "Frankly speaking, initially, we didn't understand anything in classes like artificial intelligence where we were asked to program and let the robot move. So I was blank in the first class. But after a few trials, the classes were very good and interesting."

They shared the challenges faced, and when asked how or if they could overcome them, Dixon claimed, "Well, I was working towards it. I completed all subjects, did assignments, did research, presentations, attended the conference, and experienced doing exams. It's all about investing time and effort in doing things or willingness to try new things."

From this and a few more responses, it was understood that despite the difficulty, the students were persistent to learn, complete the assignments and soon streamlined to align with the others. Their shyness faded with more interactions with the students and the lecturers. This finding is comparable to the finding by Wu et al. [13], which claimed that adjustment in Asian Masters students was assisted by pertinent academic efforts and social interaction with international mates.

#### *D. Change in Confidence*

Through the experiences and challenges faced by the students, changes in the students' confidence were traced, making them more vocal. The need for constant interaction (be it for group work or a casual conversation) with people having various views and opinions changed and developed them.

Kennedy responded, "By doing projects together with other international students, it helped me enhance my knowledge and communication skills."

Some courses required doing presentations frequently. Public speaking and the interactions led to the students becoming more confident.

Peterson mentioned, "Presenting our paper at a conference at Hong Kong University has given me lots of confidence in public speaking. Coming back to Bhutan I noticed that I have no hesitation in presenting and discussing with people."

They describe the people in UU as open and independent. The students' observations and slow diffusion to the environment later had the students become independent and open.

Many interviewees agreed that they were initially shy. One was shy to the extent that she hesitated to write an email. The application procedure brought changes in such a person as there was a constant need to write applications and email to higher authorities.

Dixon stated, "I got confidence in thinking that I can continue my master studies in an international university in future."

Graham also added, "I am looking forward to doing my masters in those fields as well." The experience made them confident to consider postgraduate studies. This finding is similar to that of Messer et al.'s research where Swiss students more likely to opt for postgraduate studies had experiences in studying abroad [7].

Jones et al. [14] stated that communication is critical for the adaptation of international students in an unfamiliar host

environment, as it promotes psychological health. Communication played a crucial role in the adaptation and growth of the Bhutanese students as well. Most of the interviewees agreed that frequent communication with various people and presentations made them more confident.

Endes discovered that the impacts of the exchange program on Hungarian students were improved confidence and language proficiency. The students admitted to recognizing a new education system, became more responsible and also made new friends from different cultures [15]. In our finding, similar changes among the Bhutanese students were seen along with gaining new IT skills or knowledge as a result of undertaking a challenging course in UU, which may or may not be present in CST. The maturity differences of the universities played a role in the students' learning a new course and knowledge related to the course.

## VI. CONCLUSION

As this study is a WiP study, with the character of a case study, its purpose is to ask relevant questions and open a field of research. There are key findings that are explicit or implicit in the respondents' answers. They gained many academic and soft skills due to their experience as exchange students.

An improvement in their confidence was a consequence of the constant interactions and presentations. They described the new environment as more independent and open. They also became so over time. Despite the challenges students faced initially, they overcame these challenges through persistence and adaptation. Those challenges, in turn, contributed to the growth of the students, like finding a new method of study.

The students enhanced their IT knowledge from courses such as AI, data mining, database, application development and research. The presence of good internet resources and the comprehensive teaching-learning method compelled students to learn beyond their norms. The learning environment was open, which helped the students to explore outside their major.

## VII. LIMITATIONS AND FUTURE WORK

The claims made in this study are from the experiences shared by the Bhutanese IT exchange students of 2016 and 2019. The study identified the challenges faced by the exchange students and how they adjusted to the challenges. The future scope of the study is on the grounds of the current finding, a study on what the host university further can do so that exchange students adapt to the environment faster.

## ACKNOWLEDGMENT

We appreciate the Uppsala Computing Education Research (UpCERG) team from Uppsala University, Sweden, for feedback on earlier versions of this paper and suggestions and encouragement. We are grateful to the seven interviewees and their patience through multiple interviews.

## REFERENCES

- [1] P. Blumenthal and U. Grothus, "Developing Global Competence in Engineering Students: U.S. and German Approaches," *Online J. Glob. Eng. Educ.*, vol. 3, no. 2, p. 1, 2008.
- [2] A. Berglund et al., "The exchange programme between new and different partners, Royal University of Bhutan and Uppsala University," 2020 IEEE Frontiers in Education Conference (FIE), Uppsala, Sweden, 2020, pp. 1-4, doi: 10.1109/FIE44824.2020.9273904.
- [3] College of Science and Technology, Dec. 21, 2020. Accessed on: Apr. 22, 2021. [Online]. Available: <https://www.cst.edu.bt/index.php/en/>
- [4] "Department of Information Technology, Uppsala University, Sweden," Department of Information Technology - Department of Information Technology - Uppsala University, Feb. 9, 2016. Accessed on: Apr. 22, 2021. [Online]. Available: <http://it.uu.se/aboutus>
- [5] A. Berglund, V. Isomöttönen, D. Lhamo, and P. Tshering, "'How research came inside me as a new knowledge': An inside perspective from two Bhutanese students on learning research in Computing Education", in 2018 6th International Conference on Learning and Teaching in Computing and Engineering (LaTICE), 2018, pp. 98-102.
- [6] J. C. Olberding and D. J. Olberding, "'Ripple Effects'" in *Youth Peacebuilding and Exchange Programs: Measuring Impacts Beyond Direct Participants*, pp. 75-91, 2010.
- [7] D. Messer and S. C. Wolter, "Are student exchange programs worth it?," *High. Educ.*, vol. 54, no. 5, pp. 647-663, 2007, doi: 10.1007/s10734-006-9016-6.
- [8] J. I. A. Gómez and C. P. Vicente, "Communicative competences and the use of ict for foreign language learning within the european student exchange programme ERASMUS," *Eur. Educ. Res. J.*, vol. 10, no. 1, pp. 83-101, 2011, doi: 10.2304/eej.2011.10.1.83.
- [9] C. Dearnley, "A reflection on the use of semi-structured interviews," *Nurse Res.*, vol. 13, no. 1, pp. 19-28, 2005, doi: 10.7748/nr2005.07.13.1.19.c5997.
- [10] R. Opdenakker, "Advantages and Disadvantages of Four Interview Techniques in Qualitative Research [44 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 7(4), Art. 11," *Qual. Soc. Res.*, vol. 7, no. 4, p. 13, 2006. [Online]. Available: <http://www.qualitative-research.net/index.php/fqs/article/view/175>.
- [11] C. Llewellyn-Smith and V. S. McCabe, "What is the attraction for exchange students: The host destination or host university? Empirical evidence from a study of an Australian University," *Int. J. Tour. Res.*, vol. 10, no. 6, pp. 593-607, 2008, doi: 10.1002/jtr.692.
- [12] P. Tshering, D. Lhamo, L. Yu, and A. Berglund, 'How do first-year students learn C programming in Bhutan?', in *Proc. 5th International Conference on Learning and Teaching in Computing and Engineering*, 2017, pp. 25-29.
- [13] W. Wu and M. Hammond, "Challenges of university adjustment in the UK: A study of East Asian master's degree students," *J. Furth. High. Educ.*, vol. 35, no. 3, pp. 423-438, 2011, doi: 10.1080/0309877X.2011.569016.
- [14] R. Jones and Y. S. Kim, "Communication experiences of international students in the US: A comparison study of cross-cultural adaptation between European and Asian students," *Sci. Humanit.*, vol. 3, pp. 83-104, 2013.
- [15] Y. Z. Endes, "Overseas Education Process of Outgoing Students within the Erasmus Exchange Programme," *Procedia - Soc. Behav. Sci.*, vol. 174, pp. 1408-1414, 2015, doi: 10.1016/j.sbspro.2015.01.768.