Exploring the motivation factors and engagement methods, towards candidate selection and sustainable data collection process for RiGHT programme

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Abstract

The ever-widening gap of the digital divide between city and rural population is a cause for concern especially in the state of Sarawak, where rural communities are sparsely populated. The RiGHT (Rural ICT Guided Home-based technopreneur) programme aims to bridge the gap by equipping their candidates from the rural community with ICT knowledge and skills. After the programme, the alumni are encouraged to provide ICT services to their rural community. However, the main issue is that engagement and follow-up with the alumni after their graduation has been minimal, causing a huge challenge to measure the outcome of the programme. Traditional follow-up methods and data collection which was initially used, required plenty of resources such as time and money. The traditional method is therefore deemed not feasible if it were to be conducted consistently.

This study aims to enhance the data collection process through a combination of methods including gamification, engagement through social media, and the adoption of an online survey. As part of the solution for alumni engagement, a prototype gamification system was developed based on the Octalysis gamification framework by Yu-kai Chou. The framework consists of eight drives which are “Human-Focused Design”, as the author believes that everything a user does are motivated by one or more of these eight core drives. The study was carried out repeatedly with three different data collection methods, namely mail survey, online survey, and online survey with gamification. Among the three, the online survey with gamification was found to have the highest response rate at 82%, with online survey at 62%, while the mail survey was found to have the poorest response rate at 56%. This means that the adoption of gamification for the online survey has successfully improved the response rate of 20%.

Alumni engagement through social media was also found to have improved the rate of contactable alumni, with an increase of 31.7% before engagement, to a rate of 57.8% after consistent alumni engagement was conducted. The alumni group created on Facebook has also helped encourage interaction, content sharing and feedback among the alumni and with the research team. The research team was also in contact individually with every alumnus, which gives them the opportunity to personally provide an update or raise a certain issue directly if they do not wish to do it in the group. For those who were not active on social media, alternative methods such as WhatsApp, Telegram, and SMS was used for the engagement instead. It has undoubtedly enhanced the alumni engagement and improved their user experience based on their feedback. The switch from using traditional (paper) data collection to online data collection, has also greatly improved the response time of the submitted questionnaire, data quality and minimized cost. When the traditional data collection method was first used, many of the questionnaires either had question left blank or answered in a wrong logic manner. Data quality has improved massively after the adoption of the online questionnaire, as it requires the participants to fill it up completely and in the correct manner. Since the data no longer requires manual
input into the computer, human error is also eliminated. Fisher’s exact test and odd ratio analysis were also carried out to understand the preference between the demographic variables of the respondents towards the different data collection methods.

In conclusion, the main novelty of the project is the proposed combination of methods (alumni engagement, gamification system, online survey) for the data collection process of a unique target group which is the RiGHT alumni. For future research, it is recommended to further repeat the study of the data collection process with the addition of a new batch of alumni, as a larger sample size is required to validate the results of the study.
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Declaration

I declare that this thesis contains no material which has been accepted for the award of any other degree or diploma and to the best of my knowledge, contains no material previously written or published by another person except where due references are made in the text of this thesis.

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Chapter 1: Introduction

1.1 Background

During the late 20th century, the term digital divide was mainly referring towards the gap between those with and without accessibility towards the telephone for communication purposes [1]. The massive digital divide between the city and rural area is apparent in developing countries all over the world and being part of the South East Asia region, Malaysia is no different. The digital divide in Malaysia’s context refers to the accessibility to telecommunications technologies and possess the necessary knowledge to operate it, which is often referred to as ICT literacy. Technological advancement in most countries, unfortunately, does not occur at the same rate for both rural and urban areas, often with those from the low-income group lagging behind. The United Nations notes that due to the widening of the information and technological gap between industrialized and developing countries, a new type of poverty known as information poverty has emerged [2]. For example, gadgets such as smartphones which are commonly owned by urban folks are unheard of in some rural parts of Sarawak, let alone own one. The lack of infrastructure such as internet connectivity can also be a deterrent since smartphones require internet data to be useful. The evolution of technology has made it become very much part of our daily life. This further underlines the need for the rural community to have access to it to enjoy the same benefits it brings to their urban counterparts.

The International Labour Organisation noted that since information is important to development, ICTs which is one of the means of sharing information, are a link within the chain of the development process itself [3]. In this era, nearly everything is done online ranging from bill payments to looking for jobs and it is crucial that everyone is given the opportunity to embrace it. Bridging the digital gap would also help fight poverty in the area as it provides endless opportunities to generate income which could also improve the social-economy of the village. The digital divide in the case of developing countries such as Malaysia would refer to the access to ICT and the ability to operate it [4].

1.1.1 Digital divide in rural Sarawak

In the context of Sarawak, the sparse nature of the rural population poses a challenging task in overcoming the digital divide. This geographical issue significantly increases the cost of implementation as compared to urban area. Some initiatives such as National Broadband Initiative (NBI), whereby Wi-Fi is set up for selected villages with the goal of increasing the rate of household broadband penetration [5]. As of 2016, there are a total of 6235 villages with a total of 1.2 million population living in rural Sarawak [6]. The sparsely populated nature of villages across rural Sarawak requires a major set up of broadband infrastructures in order to cover the entire rural community. Another initiative known as the Universal Service Provision (USP) by the government allocated a total of one million 1Malaysia netbooks for eligible recipients [7]. The netbooks were primarily distributed
to secondary and university students, especially those who are from the lower-income group and from the rural communities to provide them with the opportunity for internet access. These initiatives are commendable as it helps to solve the technological gap but unfortunately, that alone does not have a desired lasting impact. A review conducted regarding the major factors influencing the development of ICT projects carried in Malaysia highlighted the large information gap between the urban and rural communities [8]. Therefore, the rural recipients more often than not lack the sufficient skills required for putting the provided netbook to good use. The inability to perform basic troubleshooting and maintenance, in addition to the shortage of ICT service centre in the rural area, often relegates these notebooks into pieces of hardware junk once it becomes faulty. This clearly shows that the skill barrier needs to be addressed urgently as solving it is not as straightforward as bridging the technological gap.

In India, Best & Kumar carried out an investigation in 2008 regarding the sustainability failures of the (Sustainable Access in Rural India) SARI project [9]. Just like many other rural ICT projects, SARI was initially successful but could not sustain the success for the long term. The researchers concluded that some of the main reasons were due to the absence of long-term planning, goal setting and financial viability which results in the closure of the privately owned telecentre. They also noted that the sustainability failure of a project can be of various principal modes namely: ‘financial sustainability failure, social sustainability failure, technological sustainability failure and environment sustainability failure’. Investigators have also proposed some theoretical frameworks for highlighting the reasons for success or failures of these projects such as the critical success factor (CSF) and Critical failure factor models and the design-actuality [10], [11]. Meng et al. in 2013 stated that to improve services and service relevance sustainability, the factors are conducting assessments on services provided, taking the local context and local language into consideration, providing affordable pricing, educational workshops and training to the rural community [12]. The researchers further added that technology infrastructures need to be provided to rural communities through financial assistance by the government and private sectors towards building a knowledgeable community.

1.1.2 ICT literacy in Sarawak, rural ICT development, and initiatives

Some of the known telecentre initiatives in Malaysia are Medan Info Desa (MID), computer literacy centres and rural internet program [13]. The main aim of telecentres is to improve ICT education and access to information which helps the development of the nation’s social-economic status, especially in the area of the economy, education, government information and other services [14]. Although many of them were successful initially, only a handful of centres have proven to be sustainable and maintaining their success in the long term [15]. According to Nayak in 2013, despite the relationship between ICT and economic development & income generation has been commonly analyzed by researchers, the contributing factor towards the sustainability of these projects in developing countries such as India and Malaysia are not dealt with [16]. He also cited the lack of proper infrastructure
facilities such as broadband connectivity, expensive computer and equipment, poor level of e-literacy that is slowing the ICT development in rural areas.

In 1999, a pilot initiative located in Sarawak known as e-Bario telecentre received large public attention due to the remoteness of the geographical challenges where it is inaccessible by road. The main objective of the project is also to prove the possibility of achieving sustainable development, solve problems and create opportunities for community development in the rural areas with ICT [17]. Out of its population of 1,200, more than 90% of them have never used a computer before the initiative commenced [18]. On top of that, all equipment was required to be flown in by aircraft and Bario is also off-grid for electricity supply which means the telecentre depends on electricity generators to function [19]. The telecentres were powered by solar panels and diesel generator while relying on two VSAT (Very Small Aperture Satellites) for internet connectivity. During the implementation of the e-Bario project, many kinds of obstacles were faced such as expensive infrastructure, availability of skilled manpower, language barrier for resources, and low awareness among rural communities towards ICT development [20]. Despite that, the authors concluded that the project demonstrated how ICT was able to improve the lives of the marginalized community through various ways. Since the circumstances met the criteria for testing the pilot project of rural connectivity, it could possibly be setting a potential benchmark for improving the living standards of rural Malaysians through ICT. This ambitious project was deemed to be the first of its kind in Malaysia given the circumstances that were faced.

Based on the successful implementation of e-Bario, another project started off in 2003 known as E-Bedian [21]. Despite similar framework employed, the project has its own sets of unexpected problems that did not occur to e-Bario. Literacy training which is a crucial part of sustainability was organized for the community but received poor attendance. Besides, the project was further plagued by issues such as planned dialogue sessions and meetings with committee members that never materialized, inability to manager and technician for maintaining the telecentre, and also failing to acquire some form of external financial support for the satellite and internet bills. The issues faced clearly shows the importance of the commitment and support from the local community to “buy into” the project by sharing the same vision. The author also stressed the importance of using a Bottom-Up Approach for the community to feel a sense of ownership about the project, which otherwise is just a wasted effort in the long term. This demonstrates the need for empowering the locals from the community to take up the role of getting hands-on and championing the ICT initiative for their own people, in order to achieve long-term success.

1.1.3 The RiGHT programme
Based on the circumstances of Sarawak as discussed earlier, the RIGHT (Rural ICT Guided Home-based technopreneur) programme becomes relevant. Initiated by SAINS, it stands out from other
previous initiatives with the strong emphasis on some unique key focus by taking a more comprehensive approach. The first key focus is sustainability [22], whereby the programme not only equip their candidates with a wide range of ICT skills but also empower them in the capability to troubleshooting and maintaining the equipment. This ensures that in cases where computers are not functioning properly, the candidates would be able to fix and restore them to their normal operating state. With the acquired skill and knowledge, the candidates are able to ensure that their personal computers are working well while at the same time potentially benefit those in their village through offering their maintenance services.

This brings us to the next key focus known as technoprenuership, which is incorporating ICT with business. It is where candidates are encouraged to start up an ICT service centre with the skills that have acquired to generate income and also provide ICT services to their own community. Anyone interested to improve their ICT literacy or having problems with their computers would be able to engage their service which is previously nearly impossible for the rural community. Services that are provided by these existing ICT centre owners includes software training, designing and printing services, bill payment, air ticket purchase and computer maintenance. The final key focus is to establish a home-based ICT service centre, which is the first of its kind in Malaysia. A majority of the people in the rural area are from the low-income group, the home-based approach helps to keep the overhead cost to a minimal. This allows the ICT centres to provide services at a cheaper fee as compared to those operating in shops. SAINS also provides further assistance such as additional training to keep their alumni up to date and even provide computers to those who intend to start their own ICT centre which further brings down the start-up cost.

Besides bridging the digital gap, RIGHT also aims to improve the human capital of the candidates with the skills taught as it potentially helps to improve their future income and living standards. The first goal is to improve the candidate’s employability after the programme. Despite not having a university diploma or degree, the idea is for the alumni to be well-trained with ICT knowledge and skills, allowing them to become employable for jobs such as Clerical work, IT technician, IT trainer etc. Before the programme, most of them do not possess any prior ICT skills so employment in those jobs would not have been possible. Besides, it also provides a platform for the alumni to further their studies for those who which to specialize in a certain ICT skill. The second goal would be to produce alumni that become the IT pioneers in their rural villages, provide ICT services and improve the ICT literacy of the community as a whole. Since the programme also includes hands on-site visits and ICT camps in rural schools such as SMK Asajaya [23], the candidates are given the chance to impart the knowledge and put into practice the skills they have acquired. These experience are helpful for them to help serve their community after graduating.
Essentially, there are 5 phases of the RiGHT programme as shown in Figure 1.1 which starts off with the candidate selection process [24]. Applicants from rural villagers who were successfully chosen are being sponsored by SAINS, politicians and community leaders that were supporting the programme. During the second phase, candidates are given 6-month of specially tailored ICT training and practice that is in line with the needs of the industry. A wide range of ICT software and hands-on skills were taught such as Microsoft Office, Adobe software, application development, software troubleshooting, networking, hardware maintenance and also e-commerce. This wholesome approach equips the candidates with both knowledge and hands-on skills, enabling them to both maintain and troubleshoot the computer if it becomes faulty. During phase 3, career counseling is given to every individual candidate before their graduation. Professional advice is provided to help candidates explore the different opportunities for the future. These opportunities include setting up their own ICT service centre, new job opportunities, or even furthering their skills in taking up a diploma or professional certification from collages. Phase 4 is where the candidates have completed their training and are given the choice to decide on their future. Due to the newly acquired ICT knowledge and skills, job opportunities are wider as a result of their enhanced employability. The graduated alumni could choose to either look for employment, continue their studies further, or start operating a home-based ICT service centre in serving their community. Alumni are now able to apply for new job opportunities such as clerical jobs or IT technician, after acquiring the necessary skills required. The fifth and last phase is where the alumni are encouraged to provide ICT services to their local communities, especially in the rural area. It also becomes an income generating opportunity that can be done either full-time or as a side job. Besides, these alumni could also train the villagers in their community especially the youths which would help their education too. Ideally, the training and services provided would improve the rural ICT literacy in the long term.
Currently, the sponsors of the RIGHT programme include the Ministry of Rural Development (MRD), Yayasan Rakyat 1 Malaysia (YR1M) and members of parliament. They have been 9 ICT service centres that have been set up namely Telaga Air, Sungai Lundu, Tambirat, Sebangan, Kampung Bungey (Debak), and Kampung Babu (Debak). In addition to the RIGHT initiative, a new rural healthcare programme known as change CHANGE (Community Healthcare Advancement Nurturing for Growth Ecosystem) which monitors the health of residents from the rural communities in places that lack proper healthcare facilities. The initiative is carried out with the assistance of the RIGHT alumni by taking basic health readings such as blood pressure and blood sugar level of the villagers. The data gathered will be analyzed by the panel doctors, which will provide advice on the next action. It enhances the impact of the alumni contributions to their community in not only the ICT field but also in healthcare.

The RIGHT training currently has completed 10 batches and trained 87 candidates in total. Majority of the candidates are high school leavers and have not gained entry to college or university due to not meeting the academic requirements. Since the goal is to improve the ICT literacy among the rural community, only rural applicants were allowed to apply for the programme. Those applicants would also be required to at least complete high school, have a decent command of the English language, and able to work well in a team. The selection candidates come from various employment history such as construction worker, farmer, shopkeeper, driver while some others were previously unemployed prior to joining the programme. The employment history among the candidates, mainly from low-skilled jobs is understandable, as they do not possess the necessary skills required for professional jobs. While for those unemployed, the lack of employability skills makes it difficult to find employment. With the RIGHT programme, the selected candidates will be equipped with various ICT skills, helps to improve their employability and contribution towards their community.

Data collection is required to understand the impact of contribution by the alumni to their rural community thus far. The data collection needs to be consistent and timely in order to monitor their contribution and socio-economic changes over time. This would greatly require the cooperation of every single alumnus that are scattered all over Sarawak, which is no easy task. For it to be successful, alumni engagement plays a crucial role towards their willingness in the participation of the data collection process. In short, if alumni engagement were being ignored, the data collection process certainly would fail in the long-term.

1.2 Problem statement

The RiGHT program believes that it has successfully empowered the candidates they have trained over the years, especially towards finding better job employment and starting up a home based ICT centre. However, minimal concrete evidence have been gathered thus far to prove those claims. Data collection and follow-up were rarely carried out with the alumni after their graduation from the programme. This
makes it difficult to gauge the success of the RiGHT programme towards empowering the candidates. The task of consistent follow-up is challenging due to the scattered geographical nature of alumni all over the different rural villages of Sarawak. Traditional data collection methods that require physical meet-ups such as interviews and focus group would often require a substantial amount of time and resources for travel. This resulted in the loss of contact of some alumni from the target group, making it very challenging to locate them for the participation of the data collection.

A more efficient method of data collection process is required for sustainability purposes, especially if data collection needs to be conducted periodically. It would ideally require a more advance data collection process that is web-based, that could follow-up timely with the alumni, in order to monitor their socio-economic changes over time. The availability of modern communication tools such as social media and messaging applications, makes the task of connecting with a big group of people effortless. Besides, there is currently no incentive for the alumni to report their progress or achievement to their community. From a motivational perspective, the alumni are very unlikely to provide feedback voluntarily and consistently, unless provided a reasonable motivation or purpose to do so. This calls for the need to develop a gamification that would motivate and entice the alumni towards participating in the data collection process consistently. The proposed solution would be to manage engagement of the alumni through social media and chatting tools, collect data through an online data collection process that includes gamification elements.

Next, there is no reliable set of criteria in place to screen through the applicants during the candidate selection process of the RiGHT program. As a result, there is no good indication of the quality of candidates that were selected. This makes it very difficult to select candidates who are suitable to undergo the programme and meeting its goals. There were also comments about some of the alumni from their peers and trainers to have shown a lack of seriousness towards the programme. Ideally, a good set of criteria would help select candidates that are motivated and passionate towards ICT and contributing towards the development of their rural community. Therefore, a study is required to improve the criteria for the candidate selection process through the study of motivation factors. The investigation of the motivation factors would help identify which particular factor that influences the performance of the candidates during the RiGHT programme. These factors would serve as an effective guideline for the candidate selection process, enabling the selection of motivated and higher quality candidates. In the future, it could also be used for a predictive system where weightage are given to the various factors based on its importance, to predict the probability of the candidates performing well in the training.
1.3 Proposed solution

Firstly, a good data collection process would pave way for a more consistent and efficient method of obtaining valuable data from the candidates and alumni. The idea is that for the majority of the data collection process, online questionnaire will be used as it is considered to be most viable. It requires minimal resources, easy to understand and can be submitted instantaneously when completed. The improved data collection process would undoubtedly be more efficient in capturing the changes and growth of the alumni’s contribution in a consistent and timely manner. For measuring the impact, the majority of the source of data and inputs would be from the alumni of the programme themselves. Therefore, it is crucial to have the support and cooperation of the alumni, who are from different background and scattered all around geographically which is a gigantic task in itself. Previously, minimal engagement and follow-ups were made and no systematic approach was in place to document the alumni status and contribution. This resulted in some contacts being lost over the years. Thus, the need for a systematic engagement plan is required for consistent follow-ups with the alumni with the purpose of obtaining up-to-date information that is required for impact measurement.

Initially, traditional communication tools such as phone calls and SMS were used for engaging with alumni but many of them could not be reached as their phone number were no longer valid. Hence the research team decided to contact and engagement these alumni through social media. It was decided after discovering that many of them are currently active on popular platforms like Facebook and Instagram. The researchers propose that a Facebook group for the alumni will be set up to allow the engagement process and the dissemination of ICT information. However, that in itself is not sufficient in improving the engagement process alone. One potential method would be the usage of an online questionnaire. As we know, questionnaire or survey in itself poses motivational issues as to how the alumni would be willing to fill in the questionnaire properly. This leads on to the exploring the incorporation of gamification, with the aim to make the data collection process less tedious and more enjoyable and rewarding. Gamification uses methods found in games which primarily entices/motivates the user through two methods namely tangible and intangible rewards. Tangible rewards involve the use of physical gifts or vouchers that appeals to the user which are commonly adopted by cooperates in the various forms such as lucky draw or redeemable gifts with points collection. Intangible rewards involve the use non-material such as the social ranking scoreboard, player level, badges and unlocking achievements. For the study, only intangible rewards were used. Despite not being material related, it appeals to the human desire for recognition among their peers which can be equally effective in comparison with tangible rewards or if not more. A suitable gamification framework that is engaging and human-focused is required for developing a gamification system. It would consider the needs of the participant rather than motivate them with negative means such as inducing fear or anxiety.
Secondly, the candidate selection process is a crucial component towards the outcome of the RiGHT programme. A good candidate selection process would be a good tool to gauge the interest and passion of potential candidates towards ICT and assisting their rural community. The assumption is that candidates who are passionate about ICT would be more serious with the training, and therefore likely to put in more effort during the training. Hence, this thesis proposed a solution towards the enhancement of the candidate selection process. The proposed solution is through investigating the relationship between the motivation factors towards the candidate’s performance in the RiGHT programme. Each motivation and study strategies factors are being compared with the assessment results of the candidates to determine which of the factors has an impact. The outcome of this solution is that factors that are identified to play a role in candidate’s performance such as commonly found among high scoring candidates, would then be used as a guideline to screen future potential candidates for the programme. It is hypothesized that candidates with a high level of the identified motivation factor, would most likely lead to better performance for their programme.

1.4 Research objectives

The uniqueness of circumstances in Sarawak makes the study both challenging and intriguing. The primary objective of the study would be to develop a strategy for improving the response rate of the data collection process. Since the old engagement process was ineffective and unsuitable, a better approach is required to enhance the effectiveness of the data collection. Sustainable engagement methods such as gamification and social media are being experimented on to boost the participation among alumni for the data collection process. It would form a good relationship with the alumni, thus helping them to be more willing to contribute towards improving the data collection process. This would then help contribute towards a better understanding regarding the impact of the RiGHT program. The secondary objective of the study is to improve the candidate selection process. With that in mind, the research team investigates the impact of the candidate’s motivation towards their performance throughout their time at the RiGHT programme. The hypothesis is that candidates with a higher motivation level and the right motivation factors, would generally perform better and may become more impactful towards their communities. The motivation scales that are correlated can then be used as part of the guideline for the candidate selection process. Ideally, the enhancement towards a strong positive impact towards the community could be achieved, and as a result, leading it one step closer to the ultimate goal of bridging the digital divide.

In short, the main objectives of this study are:

1. **Improve the data collection process through gamification and sustainable engagement methods**
2. **Exploring the role of motivation factors towards improving the candidate selection process**
1.5 Scope of research

For the thesis, the scope of research would cover the usage of using existing ICT concepts and communication tools to enhance reachability and engagement that is sustainable. The study also only applies to the rural youths from the rural parts of Sarawak that have gone through the RiGHT programme. This means no public study of rural youths outside of the RiGHT programme was conducted. Since alumni engagement, gamification, and the data collection process will be a key component of our focus area, a proposed strategy will be thoroughly discussed and experimented upon. However, it is worth noting that a handful of alumni couldn’t be reached despite many attempts by the research team, such as through phone calls, SMS, emails and searching for their profile on social media. Since they were no response, it is assumed that the phone numbers or email are no longer in use. This makes the task of contacting them near impossible. Unfortunately, this small group of alumni is therefore excluded from the study.

1.6 Contribution of research

The main contribution of the thesis is the solution for sustainable user engagement that consist of three components. The first component is the gamification system developed based on Octalysis gamification model, to improve alumni engagement and the data collection process. Gamification concepts such as points system, leaderboard, and badges are adopted in the design of the website, which to engage and encourage the alumni towards participating the data collection. The system is enhanced with the second component of modern engagement method through social media and chatting applications. Consistent follow-up with big groups becomes much easier. The last component is adopting online collection methods. With this engagement solution, alumni engagement and the data collection process becomes more sustainable due to minimal resources needed. This would improve the viability of consistent data collection to capture the socioeconomic changes at fixed intervals of time.

The secondary contribution is towards enhancing the candidate selection process. The thesis investigates the different motivation factors towards their candidate’s programme performance. The relationship between each of the motivation factors such self-efficacy and perceived learning value, with the performance of the candidate's assessment score. This would help us identify the common factors that are shared by high performing candidates in the programme. It also helps to identify the motivation factors that are lacking, which is commonly found in low performing candidates. These factors that were identified would enable the future development of a predictive weightage system. Each factor will be given a specific weightage to predict the potential of the future candidates. Through the predictive weightage system, the RiGHT programme would be able to select better candidates, thus producing a higher quality of alumni.
1.7 Thesis structure

This section outlines the structure of the thesis according to the chapters. Chapter 1 outlines the background of the study, existing problems, objectives and the scope of thesis contribution. Chapter 2 consist of literature reviews which gives a clearer picture of the existing related studies such as models that have been done and what was learned from it. For chapter 3, an in-depth explanation of the theories used, research methods and proposed solution to overcome the problems that were explained in the first two chapters.

Next, chapter 4 and 5 discuss the experiments that were carried out for the study. Each of the experiments includes the introduction, methodology, results and discussions, and conclusion. Chapter 4 involves the exploration of motivation factors towards the performance of the candidates in the RiGHT programme, for the purpose of improving the candidate selection process. Chapter 5 discusses the study regarding the usage of engagement such as social media, gamification system and online questionnaire as a motivation to encourage participation and improve the response rate for the data collecting process.

Chapter 6 wraps up the thesis by discussing the overall findings from the experiments conducted and the limitations that were faced. Some proposed ideas for future research will also be suggested and discussed in this chapter.

1.8 Summary

In short, the goal of the study is to develop a viable solution, which would both solve the problem statements and meet the research objectives of the study. The background of the study and its purpose were being discussed in detail. The scope of research is also stated to clearly identify the target group of the study and the boundaries that covers the study. The contribution of research further explains what the research would aim to develop and ultimately help contribute towards improving the alumni engagement and the data collection process. The thesis structure provides an outline of the discussions that will be found in the various chapters of the thesis.
Chapter 2: Literature Review

This chapter aims to present the supporting literature regarding prior findings throughout the years regarding the strategies adopted for sustainable data collection, advantages and drawbacks of engagement methods through gamification and social media, and measurement of motivation factors towards learning. The chapter begins with an attempt at discussing few key areas involving the research such as the effectiveness of online survey as a data collection tool, social media, and gamification for engagement and motivating purposes. A gamification framework known as Octalysis, which the prototype gamification system is based upon, will also be addressed here. Subsequently, the chapter goes on to investigate the role of motivation towards learning performance through the use of questionnaire tools known as Motivated Strategies for Learning (MSLQ) and Self-regulating learning (SRL). As conclusion, the summary of the literature review will be presented.

2.1 Data collections strategies

This section discusses both the advantages and limitations regarding the use of online data collection methods. A comparison of literature regarding the response rate between online and traditional data collection methods will also be discussed.

2.1.1 Online data collection methods

Due to the wide adoption and the increasingly affordable use of the internet, online data collection is becoming an increasingly common practice for research, thus replacing the use of traditional data collection methods. It is suggested that electronic or online survey will become more widespread as the populations become more technologically skilled [25]. One of the main advantages of using online methods for data collection is the significantly lower cost and time needed. Schmidt states that since paper and postage is no longer needed, survey costs become a lot cheaper and quicker to conduct especially for large studies [26]. Studies carried out with paper surveys requires long postal delivery time, while the ability for instantaneous data transmission once the respondents complete the survey reduces the time required substantially to conduct the survey. Since data entry are done by respondents themselves, it removes the issue of data entry that sometimes occurs when the researcher enters the data based on traditional paper survey methods. Bhutta stated in her study that it cost around less than one cent for each survey, hence making it much cheaper as compared to mail or phone [27]. The author also added that the data could be reviewed immediately after submission and correction could be done in mere minutes if errors or omissions were found.
In 2012, Kayam affirms the key advantages of adopting online survey methods such as lower cost and time especially since facilities and staff would no longer be needed [28]. It does not require any supervision and intervention by the researcher is rarely required, since the tools are already provided by the computer. Kayam also believes that human error is being minimized and could be detected since they are usually documented. Information or instruction that were delivered to all the participants would be consistent, making it easier to spot mistakes too. The author further adds that online survey has the advantage of achieving voluntary participation as the participants were given freedom in choosing whether to take part in the study. This also means there’s less pressure towards the participants in feeling the need to participate against their own will. It also provides participants with the freedom to fill up at their convenience, as sometimes they are unavailable or busy during a certain time period which is an issue commonly faced by data collection through phone calls. Another study conducted has found that online survey was returned faster and less missing data as compared to a paper survey [29]. This is important especially if data collection is done consistently in fixed intervals.

Despite the many advantages, the use of online survey also comes with its own limitations. One major limitation would be of technical nature whereby respondents would need a computer that has internet access [30]. While most of the respondents for the research has some form of computing devices such as a smartphone, laptop or computer, the absence of internet or limited access poses a major problem to complete the survey. Browser incompatibilities also further add on to the problem regarding the software aspect [31]. However, the use of well-established online survey tools such as Google Forms would very much work well with popular browsers such as Google Chrome and Mozilla Firefox. Data pollution is another issue faced whereby a single person completes multiple submission for the survey [28]. This issue will not pose any problem in the research as the research sample is small and all the submissions by the participants have their name on it. With the name list of all the participants, this means that each submission is therefore unique to their name and multiple submission or with false names would be easily identifiable.

Lastly, one commonly cited concern among researchers is about the representativeness of the sample and data [28], [32]. This is a major problem especially for large studies that are carried out for the general public whereby only those with internet were able to participate while those without it will be left out. A certain demographic group would be left out, hence the generalizability of the outcome of the research becomes invalid. Dillman, Tortora, Conradt, and Bowker stated that researchers need to ensure that all members of the defined population have identical access to the technology required for survey participation. However, this obstacle will not affect the research done as the targeted group are specifically the alumni of the programme and has the tools and internet access needed to complete the survey.
2.1.2 Response rate comparison

Past research has reported various different outcomes regarding the response rate between the use of traditional and online data collection method. The preference towards a certain method of data collection could also be attributed towards multiple factors such as demographic background, accessibility to ICT services, and familiarity with operating the hardware needed to fill the survey. The majority of the early studies conducted in the past showed that the response rate of the online survey is generally lower as compared to the survey that was conducted through phone or mail [33],[34],[35]. A review conducted by Nulty in 2008 regarding nine literature from 1999 to 2006, found that response rate for the face-to-face administration of paper-based data collection method was generally higher as compared to the ones conducted online [36]. The average response rate of paper-based was at 56% while the online survey ones were at 33%. The author then suggests the use of email reminders and prize incentives in lottery form for boosting the response rates for online survey. Based on a meta-analysis of 39 studies comparing both the methods of survey in 2008, online survey were reported to be on average 10% lower response rate as compared to the traditional mail method[42]. Generally, survey response rates that did better as compared to the response from mail survey are known to be less common in the literature [43].

A study conducted by Wygant and Lindorf have found that the response rate of online survey was better in comparison to mail survey [37]. Baruch and Holtom in their analysis of 1607 studies regarding organizational research between the year 2000 and 2005, showed favorable results towards the use of an online survey. The analysis found that online data collection achieved higher or equal response rate as compared to the traditional mail method [38]. The authors further added that their findings showed improvement over older findings such as the one conducted in 1998 by Mavis and Brocato, whereby email surveys consistently had a poorer response rate than paper mailed surveys. It is also stressed that the population of the study plays a major factor towards the result. The population who are younger, higher education level and from larger household were generally found to be more inclined to use online survey [39]. This indicates that a more technology savvy population favours the use of online survey due to the familiarity of carrying out tasks on the internet. Some other studies conducted had a more even outcome.

A study was done to conduct a comparison of data gathered between an open online survey completed by random internet users, an offline recruited sample, and with data of the same online survey completed by members who were recruited for the offline surveys [40]. The open online survey was found to be highly skewed, while the results between the members recruited to fill in both the offline and online version of the survey showed no differences. Essentially, with the right infrastructure and hardware, it is found that online questionnaire is a strong alternative to the offline version. Kaplowitz, Hadlock, and Levine in 2004
concluded that for a population with web access, it showed a comparable response rate of the two methods conducted when both were followed by mail notifications to the participant [41]. Meanwhile, a study conducted by Dolnicar in 2009 showed that despite the in-depth review of prior work done, the results between which method has the better response rate will vary based on the topic and the target group [39]. This is further confirmed by a study conducted, concluded that response rates may highly vary between different targeted groups that were studied [29]. The authors also warned that researchers need to avoid overgeneralizing the findings of each individual studies due to the difference of the population of the study.

Touvier et al. in 2010 reported that their participants preferred completing online survey as compared to paper versions [44]. Weigold et al. in 2013 [45], conducted two studies with one being a paper and pencil survey, while the other one being an online survey. The results shown data equivalence for both quantitative and qualitative data. In 2014, a study conducted by Ward, Clark, Zabriskie and Trevor concluded that their overall findings for leisure research, the use of online data collection showed better results [46]. Most recently, a recent study conducted by David & Shona in 2018 [47] regarding the comparison of mail versus online survey, concluded that the response rates for both methods to be very similar. The authors found no patterns among their 11 studies combined, while stating that the differences were not caused by the mode of survey but rather external factors.

2.2 Engagement

Community engagement which is considered to be one of our top priority for the study, have very much been practiced in multiple domains with vastly different goals. From a government point of view such as Queensland, community engagement is stated to help find potential solutions for improving decisions and services, wider perspectives and encourages productive relationship which is key towards democracy [48]. Some cited engagement techniques which were relevant to our study were questionnaires, social media, focus groups and interviews. This view is further echoed by Putnam who believes that civic engagement encourages trust and cooperation which enables a healthy economy and democracy [49]. For the role of healthcare, modern community engagement has lately been done through social media with the purpose of disseminating health-related knowledge, measure public opinions and also encourage mutual interactions between public health professionals and also the general public. For businesses, companies such as IBM have been actively trying to merge social media with traditional customer relationship management (CRM). It serves as a modern strategy for engaging their customers through enhancing collaborative experiences and dialogues with their clients [50]. These strategies are implemented usually with the purpose of increasing profit and minimize cost.
2.2.1 Gamification for engagement and participation

Over the past few years, gamification has become a hugely popular tool for boosting user engagement by enhancing the quality of actions, frequency of user activity and social interaction [51], [52]. It is known as the adoption of game design elements for non-gaming context [53]. Despite being academically first recorded in the year 2008, the term itself only started to gain traction among industries and academicians alike in 2010[54]. At its core, gamification is essentially a persuasive technology aims at influencing and motivating the user’s behavior through the use of elements originated from game-design [55]. This makes it flexible and applicable to both gaming and non-gaming context. For example, a commonly found implementation of gamification would be the fitness industry such as Fitbit, Nike+ and Jawbone UP. These fitness equipment tracks user activity such as their distance covered and calories burn, while the gamification aspect to it adds virtual rewards for the user [56]. These concepts provide extra incentives for the user to complete their required task.

Market research is another popular area that involves the usage of gamification together with existing engagement methods in the form of surveys, focus group and even online communities. Results have shown an increase in participant interest and engagement after game elements were implemented with these engagement methods [57],[58]. According to Zichermann and Cunningham in 2011 [59], game-design elements which are sometimes also known as motivational affordance are further broken down into game mechanics and game dynamics. It consists of various different gamification mechanics such as quests, avatars, rankings, badges, levels, points system and so on. While they may differ slightly from each other, all these mechanics serves the same purpose of boosting user engagement. This usually would often result in an increase of user activity and satisfaction level from the user.

For the current market research industry and user engagement process, an online survey is known to be the majority preference for data collection method [60]. This is not surprising as it incurs very minimal resources and very convenient for both researcher and the participants alike. The role and impact of implementing gamification towards consistent online survey among the online community, have generated interested among market research companies. They have understood the importance of creating their own online communities to keep them engaged and motivated [61]. Generally, the participation of the survey is fundamentally based on the participant’s motives [62]. This would basically mean that if the participants do not see the purpose behind filling in the questionnaire, they would most likely put in minimal effort to fill it properly which results in poor data quality.

In the case of data collection, gamification plays a role in enhancing user engagement and promoting better user experience which motivates them in filling the survey [63]. The study conducted also proved that the
use of gamification has shown to substantially boost participation regardless of user backgrounds such as gender, age, and past gaming experience. In 2012, a study conducted by Malinoff have shown that the inclusion of game elements with surveys was found to had favourable impact towards data quality while also lengthening the completion times of the participants [64]. Another study conducted by Cechanowicz and Gutwin [63] further confirms this as their study concluded that respondents that were given a gamified system showed an immensely superior level of participation. The respondents completed a lot more questions, as compared to those that were given the traditional survey system.

According to Huotari and Hamari, gamification could be explained as a practice of improving services through the use of motivational affordance (game elements) to incite pleasurable experiences and also behavioural outcomes [51], [65]. Figure 2.1 depicts the conceptualization of gamification by the authors, through the usage of motivational affordance which results in a certain psychological outcome and later on impacts the behavioural outcome. Some of the motivational affordance or game elements used for the study were points system, leaderboard, badges and also level progression. As suggested by the literature that was reviewed in the previous chapter, that there is a need to improve the response rate of the online survey. For gamification being also known as a persuasive technology [66], the idea of using motivational affordance is to persuade the alumni with the aim of reaching the desired psychological outcome and behaviour outcome. The focus for the experiment would be behavioural outcomes such as an increased in engagement activities among the alumni, better response rate for the data collection methods through online questionnaires, and ultimately demonstrate willingness in reporting their contribution towards the community.

![Figure 2.1: Conceptualization of gamification](image)
2.2.2 Octalysis gamification framework

Figure 2.2 depicts the gamification framework known as Octalysis which was developed by Yu-Kai Chou in 2012, after pioneering the gamification industry and research ever since 2003 [67]. The author views the gamification framework to be “Human-Focused Design”, as it focuses on human motivation for a gamification system. This is polarizing towards the “function-focused design”, a conventional design which is usually efficiency based on getting the task done within a shorter time, which sometimes leaves a negative impact on the person. Octalysis proposes eight core drives which create an octagon shape with each core drive representing each side.

The eight core drives are: epic meaning & calling, development & accomplishment, empowerment of creativity & feedback, ownership & possession, social influence & relatedness, scarcity & impatience, unpredictability & curiosity, and loss & avoidance [68]. The author believes that humans are motivated by eight major needs, and they are linked with specific game elements that cater towards those expectations. He also stated in his book that everything a user does are motivated by one or more of these eight core...
drives that are individual of different characteristics. Some drives empower the users, while others cause obsession and urgency. This framework was selected as the eight core drives essentially encompasses the different areas of gamification. It provides the basis for the research to help determine which gamification elements were suitable and used for the proposed gamification prototype. It also helps to set the focus and understanding of the different type of motivations that drives the interest of participants to participate. Each of the eight core drives will be further elaborated below based on the author’s explanation of the framework.

**Core Drive 1: Epic Meaning & Calling** – It involves the belief of the user in doing something for the greater good or oneself, or was specially chosen for the purpose. For example, people share information and contributes towards sites like Wikipedia, despite not being paid or rewarded. They do it willingly with the aim to help others and share knowledge, without expecting anything tangible in return. This drive is part of the White Hat Core Drives.

**Core Drive 2: Development & Accomplishment** – This drive involves progression and developing skills, with the eventual goal of conquering the challenges set. Challenge is crucial for this drive, as it becomes irrelevant for the use of points and badges if the challenge factor is absent. It is also the commonly found, simplest to design and often involves points, badges, and leaderboards. This drive is part of the White Hat Core Drives.

**Core Drive 3: Empowerment of Creativity & Feedback** – This drive enables the users to participate in a process of continuously trying out new things and try various combinations. They will provide the chance to express their creativity, observe the result of their creativity, obtain feedback and make changes as required. Legos is one cited example where the user is empowered to make creative decisions. This drive is known as one of the White Hat Core Drives.

**Core Drive 4: Ownership & Possession** – This drive puts users in a position to experience the attachment and ownership of a belonging. The user would naturally feel the need to improve what they have owned into something better. This drive is commonly responsible for wealth accumulation, especially virtual currencies in a game or system. Another example is when the user-customized their profile or avatar, they essentially feel attached and acquiring a sense of ownership over it. This is commonly found in role-playing games whereby the user is required to customize their character, which they will be using for the rest of the game.

**Core Drive 5: Social Influence & Relatedness** – This drive involves social elements that become a motivation for people such as social acceptance, mentorship, competition, and envy. When a peer or friend
is performing at a better level or owning something very desirable, it drives the user to achieve it too. It also involves how a person can be drawn towards other people, places or events that they could relate to.

**Core Drive 6: Scarcity & Impatience** – This drive involves the feeling of craving for something because it is can’t be obtained immediately. It sometimes involves a certain period of time window to obtain something where the chances are limited and not permanent. Found commonly in mobile games with appointment dynamics where the user are required to revisit at a certain time period in the future to collect or obtain something desirable. Since users are not able to obtain it right now, it causes them to constantly think about it. This drive is part of the Black Hat Core Drives.

**Core Drive 7: Unpredictability & Curiosity** – This drive causes the user to become consistently engaged as they are curious about what would happen next. Unpredictability intrigues the user and naturally, the brain pays more attention to the unexpected. The twist in plots of novels and movies are one example of keeping people engaged due to this drive. Gambling addiction is also attributed towards this drive, while it can also be found in sweepstake or lottery program to engage users. This drive is part of the Black Hat Core Drives.

**Core Drive 8: Loss & Avoidance** – This core drive involves the avoidance of negative circumstances. It involves preventing circumstances such as loss of good opportunity. It brings about the prompting towards the person to act as quick as possible or else risk losing out on the opportunity forever. This drive is part of the Black Hat Core Drives.

**Left brain vs White brain drives** – The core drives on the left side of the Octalysis are usually related to extrinsic motivation, whereby the user is motivated because they are trying to achieve a goal or obtain something in return. Meanwhile known as left brain core drives, which is associated with logic, ownership, and calculation. They, the right of the Octalysis is known as the right brain core drive, commonly associated with social dynamics, creativity and also an expression of oneself. They are more commonly related to intrinsic motivations, where the user doesn’t require a reward for doing something, but rather the task or activity itself provides the sense of reward. The author also commented that the left and right brain classification does not refer to the brain geography in literal terms but rather just to depict the contrast of the two specific brain functions.

**White Hat vs Black Hat gamification** – The core drives at the top side of the Octalysis are known as positive motivation types, hence known as “White Hat Gamification”. They often provide the user with a sense of meaning, the feel-good feeling and being powerful. It also makes the user feel in control over their lives and actions. On the other hand, the core drives at the bottom are known to be more negative in nature,
which is being classified as “Black Hat Gamification”. It mostly motivates the user through fear of losing something and uncertainty of what comes next. Often times it does not make the users feel good about themselves despite the motivation. One example cited by the author is the successful implementation of the Black Hat Techniques by game companies like Zynga which relies heavily on addiction and monetization, despite not providing a pleasurable experience to the user while playing [67].

2.2.3 Alternative gamification framework

In 2004, the MDA framework (Mechanics, Dynamics, and Aesthetics) was developed by Hunicke et al [69]. It is known to be a basic framework for game design, where functions (mechanics) are developed, which in itself creates multiple user-interactions (dynamics), which leads to experiences and emotions for the user (aesthetics). This framework has been used by many researches to explain gamified systems, with the motive to reduce the gap between game design and development. The framework explains that games can be broken into three elements: rule, system and fun. In figure 2.3, the MDA framework is illustrated to be a one-way relationship from designer to user [70].

Mechanics: Describes the specific components and rules of the game, actions players can manage.

Dynamics: Describes the manifestation of the rule during run-time or actual gameplay based on player input into the system.

Aesthetics: Describes the desirable emotional responses evoked in the users when they interact with the gamified system [70].

In 2012, one of the most popular design framework is known as Six steps to Gamification by Werbach and Hunter [72]. This framework also known as 6D, comprise of six elements that are of the following: Define business objectives, Delineate target behavior, Describe your players, Devise activity loops, Don’t forget the fun, and Deploy appropriate tools. The 6D framework also suggested the following gamification elements that shares the foundation of other frameworks, namely mechanics, dynamic and components. In
the same year, Marczewski proposed another framework known as GAME [73]. GAME consist of four components: Gather, Act, Measure, and Enrich. The framework involves two phases, where the first phases involves planning and designing the best solution for the identified goals and user engagements. Gathering, through survey methods to gather important information about the user. The second part involves developing a good solution for goals and engagement, in order to measure the user activity and outcomes.

In 2014, Marigo Raftopoulos developed the Sustainable Gamification Design (SGD). The development of an enterprise gamification framework was centered upon being conscious of value creation benefits, value value destruction risk, human-centered and being ethically correct [74]. The author stated that a gamification framework that was developed based on these perspective and conscious of factors would likely create more responsible and sustainable results. Figure 2.4 shows the seven key themes the framework was based upon, believed to create value in gamification, where each theme has a corresponding value destruction risk.

<table>
<thead>
<tr>
<th>Value Creation Benefits (The Rhetoric)</th>
<th>Value Destruction Risks (The Seven Deadly Sins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engage and motivate employees</td>
<td>1. Coercive participation</td>
</tr>
<tr>
<td>Engagement</td>
<td>Coercion</td>
</tr>
<tr>
<td>2. Performance data analysis</td>
<td>2. Leaky container problem</td>
</tr>
<tr>
<td>Analytics</td>
<td>Leaking</td>
</tr>
<tr>
<td>3. Improve learning and collaboration</td>
<td>3. Technological whip</td>
</tr>
<tr>
<td>Learning &amp; collaboration</td>
<td>Channeling</td>
</tr>
<tr>
<td>4. Shape behaviour &amp; performance</td>
<td>4. Homogenisation of the workforce</td>
</tr>
<tr>
<td>Shape behaviour</td>
<td>Norming</td>
</tr>
<tr>
<td>5. Improve employee productivity</td>
<td>5. Loss of human agency</td>
</tr>
<tr>
<td>Empowerment</td>
<td>Disempowerment</td>
</tr>
<tr>
<td>Transformation</td>
<td>Misrepresentation</td>
</tr>
<tr>
<td>7. Make work more fun</td>
<td>7. Shallow and inauthentic</td>
</tr>
<tr>
<td>Fun</td>
<td>Inauthentic</td>
</tr>
</tbody>
</table>

*Figure 2.4: Raftopoulos' enterprise gamification risks and benefit [74]*

The SGD model shown in figure 2.5 below was developed based on the gamification key themes found in figure 2.4. The author states that gamification development has to be subjected to the same models and framework that are commonly used and tested in the fields. Hence, the framework has built in flexibility as the author believes that gamification design requires room for creativity. The SGD model consist of four
steps: Discover, Regrame, Envision, and Create. The model also has two axes, namely: Reflect/Act and Understand/Make in order to present how the activities in each quadrant are doing. Meanwhile, values and ethics being important factors for gamification design are therefore placed in the center. The author believes that values and ethics are crucial towards managing the value destruction risk in figure 2.4 and should be emphasized in every part of the development.

![SGD model and design process](image)

### 2.2.4 Comparison of framework

Every gamification framework model has a certain specific focus, hence it’s where its strength is. The Octalysis centers upon human-focused design, measures the core drives that are split into left versus right brain, black versus white hat gamification. The left brain core are the logical and intellectual, while the right brain core drive are associated with social aspects and creativity. White hat motivates user positively while black hate motivates with a negative manner. The MDA framework meanwhile is commonly adopted in game design and consist of three components, mechanics, dynamics and aesthetics. A one way relationship from develop to user is found in this framework. It is a very broad framework which becomes the foundation for many common framework that are more specialized. One weakness is that this framework is not specific enough to be applied and requires further enhancement to suit the need of the field and target group. Next, the 6D framework consist of the six elements in the design process. While 6D is one of the well-known framework, it is more targeted for the business field and productivity oriented. GAME is a simpler framework that first focuses on gathering information of the users. Subsequently, acting on it would be designing the best solution for engagement, followed by measuring user actives and
enriching the design over time. Lastly, The SGD framework focuses on ethics and value that are sometimes forgotten in other frameworks. It is mainly inspired from past research and is created for an enterprise gamification design process. Table 2.1 shows a summary of gamification frameworks that was briefly discussed.

<table>
<thead>
<tr>
<th>Framework Model</th>
<th>Context</th>
<th>Scope</th>
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</thead>
<tbody>
<tr>
<td>Octalysis, 2012</td>
<td>Gamification design</td>
<td>Core Drives</td>
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<tr>
<td></td>
<td></td>
<td>Left / Right brain</td>
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<td></td>
<td></td>
<td>Black / White hat</td>
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<tr>
<td>MDA, 2004</td>
<td>Game design</td>
<td>Mechanics</td>
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<tr>
<td></td>
<td></td>
<td>Dynamics</td>
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<tr>
<td></td>
<td></td>
<td>Aesthetics</td>
</tr>
<tr>
<td>6D, 2012</td>
<td>Gamification design</td>
<td>Define Business</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Objectives</td>
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<tr>
<td></td>
<td></td>
<td>Delineate target behavior</td>
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<td></td>
<td></td>
<td>Describe yours players</td>
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<td></td>
<td></td>
<td>Devise activity loops</td>
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<tr>
<td></td>
<td></td>
<td>Don't forget the fun</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deploy appropriate tools</td>
</tr>
<tr>
<td>GAME, 2012</td>
<td>Gamification design</td>
<td>Gather</td>
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<td></td>
<td></td>
<td>Act</td>
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<td>Measure</td>
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<td></td>
<td></td>
<td>Enrich</td>
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<tr>
<td>SGD, 2014</td>
<td>Gamification design</td>
<td>Discover</td>
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<td>Reframe</td>
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<td>Envision</td>
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<td>Create</td>
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<td>Values/Ethics</td>
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<td></td>
<td>Reflect/Act</td>
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<td></td>
<td></td>
<td>Understand/Make</td>
</tr>
</tbody>
</table>

Table 2.1: Summary of gamification frameworks

2.2.5 Drawbacks of gamification

Despite the upward trend of the usage of gamification, there is still a lack of solid indications of the positive impacts of gamification under various circumstances [52]. Besides, some of the studies conducted have also produced mixed results. For example, a study conducted by Puleston and Sleep [75] showed certain gamified design resulted in better response rate while some other design displayed the total opposite. Well-established theoretical frameworks and empirical research are also limited due to the nature of gamification and social media for engagement for rural communities are comparatively new in the academic world. Another study warned about the risk of using gamification in the wrong way and making it mandatory may lead to the feeling of being like school due to introducing rule-based experiences [76]. The authors commented that participants may feel fearful due to unsuccessful attempts and deemed as a failure. This practice should be avoided as it defeats the purpose of trying to engage the target group through positive motivation and improving user experience.
2.2.6 Social media for engagement

Concurrently, the emergence of social media has also massively changed the landscape of modern communication. In 2008, Liu & Larose states that social network sites (SNS) have proved to be effective in building good relationship and friendship [77]. It is increasingly becoming a popular tool for communication and keeping in touch with friends and family due to the minimal cost, ease of use and unbounded distance. Meanwhile, for the purpose of research, the unseen engagement work with the community or target group is often underrated despite being a critical role [78]. The author further acknowledges that failure to properly engage them would potentially threaten the success of the project as they might not be willing to participate in the study. This issue calls for consistent interaction and follow-up in order to gain the trust and favour of the target group. Therefore, SNS is identified as a promising tool to play an important role for the researcher in keeping in touch with the target group as it provides a reliable platform for two-way interaction and feedback.

As far back as 2009 in the healthcare industry, Carleen Hawn has reported new methods of engagement whereby doctors stay in touch with their patients through social media known as “Hello Health” [79]. Patients are given the choice to seek advice through instant message or video chat through their social network platform. These successful revolutionary practices started taping into the vast potential of using social media as a powerful engagement tool. It demonstrates that the engagement method can be replicated in every other industry that requires strong engagement with their customers or target groups. It is also a great deal in the research world as it would revolutionize how research is being conducted in the future.

2.2.7 Social media for data collection

SNS was also found to be very beneficial towards the data collection process. Past studies have found that social media sites like Facebook proved to be a cost-efficient way and effective at reaching the targeted study group [80]. Kayam and Hirsch noted that through the adoption of social media for their study, they managed to reach participants over a large geographical area. At the same time, they also successfully acquired responses over a short time despite no incentives were involved [28]. For researchers, it provides the platform for consistent follow-up of the targeted group. The author also suggested that due to technological advancement, only recently researchers are starting to investigate how the internet or social media is used as a method for conducting their research. Facebook in particular, due to its massive popularity, has become the preferred SNS of choice for data collection. Past studies have found that social media like Facebook proved to be a cost-efficient way and effective at reaching the target group [80]. This enables researchers to conduct consistent engagement of the target group through Facebook at relatively minimal cost. It is also important to note that poor survey design such as long would also lead to low
completion rate and quality of data. In 1991, Krosnick indicates that survey respondents often gradually lose interest and shows declining effort as they progress through the questions while filling the survey [82].

In 2009, Brickman-Bhutta concluded that the research carried out with Facebook being used as a tool for data collection was very rare [27]. Being one of the earliest researchers to perform data collection on Facebook, the author recruited participants through creating a religious-based group and successfully obtained 2,788 replied questionnaire after only 5 days. The author also remarked that the existence of these social networking sites and the use of online questionnaire has made it drastically faster, cheaper and easier to conduct survey than before. For researchers, it also provides the platform for consistent follow-up of the target group. As of June 2017, Facebook is the most popular SNS thus far and has surpassed the 2 billion active user mark, and is still growing [83]. The stats demonstrate the vastness of its user base and its huge potential in the role of data collection. In 2011, Heller and Parasnis stated that in order for companies to harness the potential of social media, they would need to provide experiences with tangible value for customer’s time, attention, and data [84]. The author further adds that despite the adoption of social media is rising, only a tiny minority of them would engage frequently. For the purpose of research, it clearly depicts the need for a solution to develop the desired value in order to successfully engage the target group. In other words, the solution needs to provide an effective motivating factor for the participation of the data collection.

2.3 Role of motivation and study strategy factors towards learning

Motivation is widely accepted as one of the key factors behind most successful stories. It is the thing that drives an individual forward to archive the intended goal. There are various forms of motivation which will be discussed later which have a different level of impact on an individual which varies from one person to another. Taylor in 2012 states that in the context of the learning process, motivation is commonly known to be the internal drive of the learner to do well in academic tasks which are described as achievement motivation [85]. That too applies to the candidates of the RIGHT programme where interest specifically in the area of IT is crucial to doing well. An individual that is motivated naturally would have higher curiosity and self-initiative to learn by being more proactive in class and making a constant effort to become better. This would later on eventually translate into better academic achievement and mastery of the subject taught. It could be shown by being attentive in class, do regular revision or as simple as completing the given assignments well. Lynch in 2016 reported that in a college physics course, the semester grade of the students’ was found to be positively correlated with their efficacy, task value and intrinsic and extrinsic motivation [86].
Study strategies at the same time plays a huge role in students’ academic achievement. A study done by Ames & Archer on high school students showed that learning strategy was correlated with their grades and mastery in the subject [87]. Every student will have their own strategy or approach to study but some factors are universally accepted to be the ideal for studying such a quiet environment without distractions. It could also be the level of self-regulating of the student to ensure they put in the effort needed to do well. It is found that student achievement cannot be improved with the understanding of cognitive and metacognitive strategies alone, as it requires the student to be motivated to apply the strategies and at the same time regulate their effort and cognition. [88], [89]. This clearly means that a student could have the most effective study strategy but not necessarily guarantee good academic achievement as motivation from the candidates has to be present. Hence it is therefore important to evaluate both the motivation and study strategy of the students objectively.

2.3.1 Questionnaire tool: Motivated Strategies for Learning Questionnaire (MSLQ)

MSLQ is currently one of the most popular self-regulating learning strategies and uses a social-cognitive framework of motivation and learning strategies [90]. Ducan & McKeachie in 2005 notes that the MSLQ framework theorizes that motivation is dynamic and contextually bound and learning strategies can be learned and acquired, which also means that their motivations and learning strategies may vary based on the course itself [91]. They also note that MSLQ is used in over hundreds of education research projects for measuring student motivation and strategy use and has recently gained renewed interest in measurement literature [92], [93], [94].

MSLQ was also used to predict academic achievement of undergraduates in Malaysia [95]. The MSLQ is made of 81 items which are divided into the motivation section and learning strategies section. MSLQ is considered to be reliable and valid instrument [96] and primarily designed for assessing college students’ motivational orientation and learning strategies. Reliability generalization is further conducted by Taylor in 2012 which tested the MSLQ with various different samples and obtained generally reliable scores, further proves that MSLQ can be used for a wide range of research and yet maintain reliable [97]. Some questionnaires or surveys are also developed based on the MSLQ such as the student’s motivation towards science learning (SMTSL) specifically for the area of science learning [98].

The main reason for choosing MSLQ is mainly due to its reliability across various types of research and being one of the most used measures for self-regulated learning in various educational environments [99], [100], [101]. MSLQ proved to have positive results of reliability generalization studies that show MSLQ is effective for different types of samples [97]. MSLQ is also shown to be suitable as it was tested across
different disciplines which consist of foreign language, computer science, natural science, social science and humanities [90]. Hence, it is relevant for the research of the RIGHT programme due to the nature of the course which is educational based multiple research confirming that it is tried and tested to be able to obtain measurement accurately.

Another reason MSLQ was chosen because it focuses on the motivational factor of the learner which is crucial but absent in both LASSI and MAI as they are more focused on the learner’s cognition processing. Due to motivation being one of the key focus towards this research, MSLQ is considered to be the most suitable SRL. The MSLQ scales are also proven to be robust with the completion of two confirmatory factor analyses which indicate reasonable factor validity. This aside, it also shows good internal consistency [102] and the scale is selected based on their Cronbach alpha reliability score and relevance towards the study.

2.3.2 Self-Regulating Learning (SRL)

According to Bandura, self-regulation is known to be the three cognitive processes used by an individual towards goal attainment is self-monitoring, self-judgment, and self-reaction [103]. To understand student’s performance and the main factors affecting it, cognitive and metacognitive self-regulation learning or strategies (SRL) has been the focus as they have been found to be most often reported in current research related to academic achievement [104]. According to Zimmerman regarding SRL is that learners are considered to be self-regulatory to the point that they are motivationally, metacognitively and strategically active participants in their self-learning [105].

Pintrich views SRL as a: “constructive and active process whereby goals are set by learners for their learning is restricted by the goals set and contextual features within the environment” [106]. It is found that an increase in research has shown that the metacognitive strategies used by students are not just based on skill, but also a matter of motivation [107], [108]. However, most SRL were designed for targeting at older students especially in University levels as the need to self-assess can be overwhelming for younger students. The commonly used SRL tools are known as Learning and Study Strategies Inventory (LASSI) [109], Metacognitive Awareness Inventory (MAI) [110] and Motivated Strategies for Learning Questionnaire (MASQ) [102].

2.4 Summary

Table 2.2 and 2.3 (reference from [25] – [47]) summaries the literature discussed in chapter 21. It depicts the advantages and drawbacks of the various methods respectively. Prior studies have shown that there is no survey method that is superior to the rest. As we quote Faas and Schoen, merely using online
questionnaire alone is insufficient [111]. Hence it is the focus of the research to establish strategies to maximize response rate for the survey conducted, instead of trying to determine the best method for obtaining the highest response rate while also taking cost and viability into account. Social media alone for engagement is deemed insufficient, as another motivation element is needed to retain the interest of participation from the target group in the data collection process. Hence, gamification has been identified to provide the motivating factor to encourage participation in the data collection that is conducted online. The study would help determine how effective the inclusion of using gamification towards the response rate of the data collection process. A combination of online survey, gamification, and engagement through social media is the proposed solution towards the issue of low response rate and poor engagement. After that, the study involves the use of MSLQ to determine how the motivating factor affect the study of the target group during their RiGHT programme. The motivation element of gamification will be the key component of interest in the research towards improving data collection process.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Boost user engagement</th>
<th>Improve data quality</th>
<th>Boost participation</th>
<th>Ease of consistent data collection</th>
<th>Better reach</th>
<th>Prevent human error</th>
<th>Faster rate of data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional survey</td>
<td></td>
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<tr>
<td>Online Survey</td>
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<td></td>
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</tr>
<tr>
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</tr>
<tr>
<td>Combination</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

*Table 2.2: Advantages of the methods adopted*

<table>
<thead>
<tr>
<th>Methods</th>
<th>High cost &amp; time</th>
<th>Requires internet and device</th>
<th>May cause disappointment of failure</th>
<th>Minimal framework</th>
<th>Minimal studies for engagement uses</th>
<th>Human Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional survey</td>
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<td></td>
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<tr>
<td>Online Survey</td>
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<tr>
<td>Gamification</td>
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<tr>
<td>SNS</td>
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<td>Combination</td>
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</tbody>
</table>

*Table 1.3: Drawback of the methods adopted*
Chapter 3: Methodology

This section discusses the proposed methodology and framework that the research will be based upon for conducting the study of the research. Majority of the data collection for the research conducted was done through an online survey with the target group, which are the alumni. A gamification framework known as the Octalysis Gamification Framework developed by Yu-Kai Chou is adopted. The gamification prototype is developed based on this framework which will be elaborated and discussed later on. To conclude the chapter, the planned study will be summarized into 2 phases that will be explained in table 3.1.

3.1 Research phase

![Diagram of RIGHT project cycle]

Figure 2.1: RIGHT project flowchart

Figure 3.1 depicts the flowchart of the RIGHT project cycle. The rural youths who were selected will undergo the training for 6 months. Once graduated, they would either look for a job, further their studies or start up their own ICT center. The ideal scenario is for the alumni to provide ICT services or assistance to their own rural community. Phase 1 involves investigating the impact of motivation factors towards the performance of the RIGHT candidates during their programme period. Phase 2 involves the designing of a solution to engage and motivate the alumni towards participating in the reporting of their updates with the online data collection. The proposed solution includes the use of social media and communication tools such as Facebook, WhatsApp, and Telegram for engagement purposes with the alumni. A prototype gamification system is also being developed as a motivating factor towards encouraging the alumni towards participating in the online data collection. The novelty of the research project is the combination of solution which are the gamification system, alumni engagement through social media, and adoption of online survey towards a unique target group which is the RIGHT alumni in Sarawak.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Technique used</th>
<th>Focus</th>
<th>Target group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• paper questionnaire</td>
<td>Role of motivation and study strategies towards programme performance, for improvement of candidate selection process</td>
<td>Current RiGHT Candidates</td>
</tr>
<tr>
<td>2</td>
<td>• Engagement methods • paper questionnaire • online questionnaire • gamification</td>
<td>Engagement and gamification for improving alumni engagement and the data collection process</td>
<td>RiGHT alumni</td>
</tr>
</tbody>
</table>

*Table 3.1: Summary of the research phase*

3.1.1 Phase 1: Investigating the role of motivation factors towards improving the candidate selection process

The first objective of the study shown in Table 3.1 is to improve the candidate selection process. The knowledge gap for this phase is the absence of a reliable guideline for the RiGHT candidate selection process. This is done by identifying the roles of motivation factors, in order to be used as a guideline for screening potential candidates in the future. Motivation factors were chosen as the focus of study because literature reviews in previous chapter have shown that students are affected by their motivations. Based on the lifecycle of the project, the research team has discovered that the candidate selection process being the first stage, needs to be improved to recruit better quality of candidates. The hypothesis is that highly motivated candidates with the right type of motivation, would most likely perform better during the programme, thus lead to greater contribution towards the community after the programme. Therefore, the purpose of this study is to determine the correlation between motivation factors with the candidate’s programme performance, which ultimately will be used to enhance the candidate selection process and close the knowledge gap stated.

The main method of data collection during this study is through the use of paper questionnaire. The candidates were given the motivation and study strategies questionnaire, whereby the results of the questionnaire were compared with the performance of their assessment during the programme. This study was conducted over 2 batches with the candidates from the various different demographic background. A modified version of the Motivated Strategies for Learning Questionnaire (MSLQ) was used for the investigation. The hypothesis is that candidates with high motivation qualities have a better chance of being actively contributing to their community through providing ICT training and services. Further discussions will be found in Chapter 4.
3.1.2 Phase 2: To improve the data collection process through gamification and sustainable engagement methods

The next and primary objective of the study is to develop a combination of solutions that includes a gamification system, engagement through social media, and online survey to enhance the data collection process. The knowledge gap for this phase is the need for sustainable engagement methods. The objective of this proposed solution is to improve alumni engagement, and also the response rate and response time for the data collection process. The purpose of adopting social media is that it potentially offers better reach towards the alumni, most whom previously were unreachable through phone or email. While social media has been commonly used to conduct questionnaire studies in this internet age, the effectiveness is still rarely being researched. Since the target group for this study is the RiGHT alumni are scattered all across rural Sarawak, the use of social media for sustainable engagement is justified. Other engagements and distributions methods were also studied and discussed in this study. Ideally, the proposed solution aims to fill in the knowledge gap by creating a viable and sustainable engagement solution that would improve the data collection process.

The first part of the proposed solution involves establishing sustainable engagement with alumni. It also requires the implementation of a prototype gamification system in an effort to motivate the alumni to participate in the online survey. The first focus of alumni engagement is crucial towards the data collection process as it requires the willingness of the alumni to participate, which therefore requires relationship building through constant communication. Initially, only conventional communication tools such as phone calls, SMS and Email was used but the response was poor due to various reasons such as outdated phone numbers which will be discussed later. The research team then choose a different strategy through engaging the alumni via social media and modern communication tools like Facebook, WhatsApp, and Telegram. Since the alumni were found to be much more responsive and showed a higher willingness to participate, the switch of strategy was justified. The online survey was also distributed to the alumni through a Facebook group which was a very efficient method as compared to mailing the hard copy version to their address, which requires more time and incurs more cost.

To further encourage the participation of the alumni in their willingness to take part in the data collection process, gamification was implemented for the research. Gamification is viewed as a non-monetary incentive approach for the alumni to fill in the online survey. Gamification has been widely used in the past few years especially in the marketing sector where it is being integrated into services or products, usually with the goal of enhancing user engagement and usage. The idea behind the integration of gamification elements was to create a motivational factor for participation through creating competition, sense of
achievement and reward among the alumni. A prototype of a gamification system is developed based on the Octalysis gamification framework developed by Yu-Kai Chou. The main core drivers of the research used are epic meaning & calling, development & accomplishment, ownership & possession, and social Influence & relatedness. The hypothesis is that alumni who are highly motivated and engaged, are more likely to willingly contribute towards the data collection process (filling the questionnaire) and also contributing towards the society. No tangible rewards was used for any of the study conducted.

3.2 Data collection methods

3.2.1 Personal interview

Initially, traditional data collection methods such as personal interview and telephone calls were primarily used during visits to alumni in the rural parts of Sarawak. Phone calls were also used for further follow-up. The alumni visit conducted is very resource demanding due to long travel but in return, it usually provides the most in-depth answers as compared to the other methods that were used. It is however not sustainable due as it incurs a lot of time and cost especially for visits that require flight travel. Since the alumni are the direct beneficiaries of the RiGHT programme, they are the group who are able to provide substantial information about their experiences, benefits gained and how it has impacted their personal social-economic growth. The interviews were mainly conducted in the homes of the alumni during the visit which is where some of the alumni run their own home-based ICT centre.

3.2.2 Questionnaire

Subsequently, a survey or also known as questionnaire, was primarily used for data collection during the study. Initially, traditional data collection method of printed hardcopy survey was used. After a pilot study, the limitation of hardcopy survey was an obstacle. It was time-consuming for the return of the completed survey from the rural village back to the research team and many errors of answering the questions were found. Hence, the research team decided to switch to the use of online data collection method through online survey, as it is more viable for the study especially towards collection data from the alumni who are spread geographically. The research team realized that this method was better in collecting "on the surface" data that does not require much in-depth information such as demographic and experience related data. However, when it comes to opinion related data, questionnaire often fails to obtain a specific response as it is not possible to request further clarification unlike interviews or focus group methods.

According to Evans and Mathur, online questionnaires is an excellent tool for research and has significant advantages over alternative formats [81]. Some of the discussed advantages include global reach, flexibility, and convenience, ease of data entry and analysis and low preparation cost. These advantages suit the study
due to the various different challenges. For example, due to flexibility and convenience of using online questionnaire, the alumni could fill it up at their own free time and submission is instant once completed. Furthermore, the task of data entry and analysis becomes much easier and human errors are reduced, which improves the accuracy of the data analyzed. However, online questionnaires are not without its drawbacks as it too suffers from certain weaknesses such as low response rate, technology variant and also unclear answering instructions. To counter these weaknesses, steps are taken to minimize the negative impact such as making the research team available to provide further explanations personally to any alumni that are unclear about the questionnaire. Some common potential weaknesses such as sample selection and skewed attributes of Internet population does not affect the study as the sample of participants are all alumni of the RiGHT programme, which is a constant variable of the study.

3.3 Engagement methods

3.3.1 Social media

During the start of the study, traditional engagement methods such as phone call, SMS, and email were used to keep in touch with the Alumni of the RiGHT programme. However, the research team discovered the issue whereby some of the phone numbers and emails are no longer active due to wrong or outdated information. A shift towards the usage of online engagement methods was then employed. Social media and modern communication tools such as Facebook, WhatsApp and Telegram were then adopted after finding out about the active usage of the alumni in those platforms. A Facebook group was specifically created for all the alumni from the different batches, where interaction, latest achievement updates, and sharing of latest technological information was done among the group. Social media was chosen as it allows various types communication such as one to one conversations, group conversations, sharing of information in the form of pictures or videos, which enables the researcher to keep in touch regularly with the alumni of the RiGHT programme. Based on the researcher’s experience, the usage of social media has also been a less threatening method for keeping updated with the alumni as compared to other conventional alternatives such as phone calls or email. Questionnaires were also shared through the group for the alumni and the response rate was much higher as compared to the usage of email which was previously done.

Previously, engagements with the target group of rural ICT initiatives who are the rural communities are rarely conducted. Engagement is necessary to understand how these initiatives have benefited them. This contributes to one of the motivations for carrying out the study and also devise a strategy to engage them through taking into consideration the existing issues faced such as limited bandwidth in certain places despite the availability of internet access, time and cost of travel, geographical location of the alumni and ICT facilities available. Initially, after doing a check on social media such as Facebook, the majority of the
alumni were found to be very active on the particular platform. The idea was to connect and engage with the group of alumni through social media due to the advantages of minimizing cost, ease of use and most importantly the high level of usage among the alumni. While the particular method most definitely isn’t new, the combination of existing methods to improve the engagement and data collection process for the targeted unique group (RiGHT alumni) is the novelty of the study.

3.3.2 Gamification

Gamification is used to enhance the engagement experience for the alumni and also to provide motivation for participation in the data collection process. It also helps to encourage competitions among the alumni to actively contribute and be proud of their achievements towards the community and their self-development. Since online questionnaire was the main data collecting tool, gamification was adopted together with the online questionnaire, with the aim of boosting the response rate of the alumni. Gamification was implemented through a website with the use of scoreboard, badges and personal profile score for every alumnus. However, it is worth noting that due to the limitation of internet infrastructures in the rural area, game elements that require heavy graphics or animation were avoided. Besides internet connectivity, the hardware of the computing device of the alumni is also taken into consideration. As most of the alumni are from the lower income group, their computing device might not be able to support elements that require a lot of computing resources. It would only defeat the purpose if some of the alumni could not access it either due to slow internet or doesn’t have the hardware to run it well.

Some of a few recognized gamification framework are such as the Octalysis by Yu-kai Chou [67], MDA by Hunicke et al [69], ‘6D’ by Werbach and Hunter found in Six Step to Gamification [72], GAME by Marczewski [73], and Susitanable Gamification Design (SGD) framework by Raftopoulos [74] as was discussed in Chapter 2.

3.3.3 Octalysis gamification framework

Choosing the right gamification framework for the context of this research is very important as it could potentially determine the outcome of the study. While there is no single “best” gamification framework, it is understood that different framework has different strengths and area of focus. An opinion also shared by Orwin and the other co-authors, the choice for using Octalysis Gamification Framework was because it provides a thorough framework for engagement, which is established on motivation and self-determination theory [76]. It concentrates on a gamified system which is human-centered design, while the other frameworks are commonly more focused on pure efficiency due to being function-focused design. They are also usually business oriented, targeting their customers or their staffs. While those framework may be
great in those field, it does not suit our target group for engagement. Since the study heavily involves in alumni engagement, a human-centered design focus is important to ensure the needs of the participants or target group are met. On top of the game mechanics that are commonly found in other gamification frameworks, the Octalysis framework also addresses the human-centered design in all eight of the drives. The author believes that everything a user does, are motivated by one or more of these eight core drives that are individual of different characteristics. This is especially found in the two core drives, namely epic meaning & calling, and empowerment of creativity & feedback. The epic meaning & calling encourages the users to contribute towards being a role model, helping others or towards the greater good, despite the lack of tangible rewards. The empowerment of creativity and feedback core drive encourages the user to explore and try out the gamification system, and then voice their opinions or feedback.

Figure 3.2: Octalysis of proposed gamification solution prototype

Figure 3.2 depicts the adoption of the Octalysis framework that was developed by Yu-Kai Chou in 2012 [67], for developing the prototype of the proposed gamification prototype. The octagon will expand or retract based on how much each of the drives is involved in the system. The main four core drives that were selected for the design to be based upon were namely Epic meaning & calling (Drive 1), Development & Accomplishment (Drive 2), Ownership & Possession (Drive 4), and social Influence & Relatedness (drive 5). The secondary core drives are Empowerment of Creativity & Feedback (Drive 3), Scarcity & Impatience
(drive 6), Unpredictability & Curiosity (drive 7), and Loss & Avoidance (drive 8). Figure 3.3 also shows the different gamification mechanics that are classified their respective core drives. The gamification mechanics used are:

A) Main core drives

**Epic Meaning & Calling (Drive 1):** Contribution towards programme improvement, provide inspiration as a role model towards future candidates, become pioneers of improving data collecting process

**Development & Accomplishment (Drive 2):** Status and rank, leaderboard, leveling up, progress bar, current score, badges

**Ownership & Possession (Drive 4):** Avatar, progression, status

**Social Influence & Relatedness (drive 5):** Compare achievements, ranking/score competition, conformity, encouragement from peers

B) Secondary core drives

**Empowerment of Creativity & Feedback (Drive 3):** Encouraged to voice opinions, give feedback, report achievements

**Scarcity & Impatience (drive 6):** Time limit for bonus points and survey submission cut-off date

**Unpredictability & Curiosity (drive 7):** Random bonus points

**Loss & Avoidance (drive 8):** Avoid missing out on bonus points, avoid being bottom or left out in the leaderboard

Essentially, the goal of adopting gamification is to enhance the user experience during the data collection and engagement process. The implementation of the gamification prototype is hypothesized to encourage the target group to participate in the online survey, which in this research are the alumni of the RiGHT programme, to give an account of their personal achievement and progress towards providing IT services to their community. The research team believes that it is essential to encourage the target group through positive motivation. It is shown through the selection of the primary core drives that the gamification prototype is based upon are mostly towards the White Hat gamification approach. For example, core drive 1 which is epic meaning & calling, encourages the participant to contribute to a greater cause. It provides a motivation to give back to the programme that they have undergone, by becoming part of a group of pioneers that helped in the improvement of the data collection process. By doing so, they would also become a role model for the newer batch of programme candidates. For core drive 2 (development &
accomplishment) and 4 (ownership & possession), the features aim to generate a sense of development, accomplishment and also ownership for their participation in the survey study. Some of the features for the participants include a leaderboard, status and rank, progress bar, badges and also progression. These features such as ranks would motivate participants to try to attain the highest possible rank, status and avatar. Thus, it also helps create healthy competition among the peers which is also part of core drive 5. Those who are reluctant to participate would feel encouraged to do so, when they see others taking part in the survey study and gamification system.

For the secondary core drives that were based upon, most of them (core drive 6,7,8) are of the Black Hat approach except core drive 3. The third core drive which is the empowerment of creativity & feedback, encourages the target group to voice their opinions and feedback. It would be regarding the issues encountered while participating in the survey study, prototype system and also to report any activity or achievement they have contributed to the society. While for core drive 8 (Loss & Avoidance, it involves the mechanics of the risk of losing out on points and being bottom of the leaderboard if the alumni refuse to participate in the survey. Core drive 6 involves the implementation of a cut-off date which is the time limit for submissions, and random bonus points are minor game mechanics that keep unpleasant experiences to a minimal. This features give a time frame for submission to create a certain sense of urgency for the target group. Core drive 7 involves unpredictability mechanics through the inclusion of random bonus points that are awarded at a specific duration of time. For example, the additional bonus would be granted to participants that submit their survey form within the first three days. It would hypothetically motivate them to submit within that time period, in order to earn more points and be at a higher position on the leaderboard as compared to their peers. Ultimately, the research team aims to make the task of participating in the survey study to be an empowering and enjoyable experience rather than a bad one. This means the system should avoid causing the feeling of guilt, shame or uncertainty towards the target group or participants.

3.4 Summary

This chapter describes the two research phases of the study and the methodology used. Phase 1 involves the study of the role of motivation factors towards the candidate’s performance in the RiGHT programme. Phase 2 is the study to improve the data collection process through gamification and sustainable engagement methods. Data collection methods such as personal interview and questionnaire were discussed. Next, the chapter discusses the proposed engagement methods that includes usage of social media, online questionnaire and gamification. The chapter ends with the discussion on the Octalysis gamification framework that the gamification prototype is based upon.
Chapter 4: Exploring motivation factors towards the performance of the candidates in the RiGHT programme

4.1 Introduction

This chapter discusses an experiment that was conducted to evaluate the motivation and study strategy factor towards the performance of candidates during the RIGHT programme. The experiment was conducted with a modified version of questionnaires based on the Motivated Strategies for Learning Questionnaire (MSLQ) and students’ motivation towards science learning (SMTSL). Initially, Pearson’s correlation was used to analyze the data for the study. However, after various feedbacks regarding that since the performance score of the candidate’s results were not evenly distributed, a non-parametric approach such as Spearman’s rho was selected to provide a better measurement of the correlation between the evaluated factors and the performance score. Based on the outcome of this experiment, it would help to pinpoint the motivation factors and study strategies that correlate with the performance of the candidates. The findings of the factors that correlates with their performance, would in turn be used as a guideline to improve the candidate selection process of the RiGHT programme.

The purpose of this study is to identify the correlation between candidate’s motivation and study strategies with their performance in the programme. The hypothesis is that candidates with good motivation and ideal study strategies, are more likely to perform well in the programme as compared to those who do not. In this case, the candidate is classified as successful if they are able to contribute to the ICT development in the rural community after graduating. A set of questionnaires is used to measure the motivation and study strategy of the candidates. The ideal scenario for the candidates to impact their community would be to provide ICT training and services by setting up a home-based ICT centre. It is also assumed that those who performed well for the assessments in the programme would have a better chance of becoming a successful candidate. The findings of this study could be used to enhance the selection process of the candidates, ideally to identify candidates with better prospects of becoming successful. The factors that are highly correlated with candidates’ performance would be used as a filtering guideline during the selection process. This would in turn help to improve the chances of candidates setting up an ICT centre that would essentially help improve the ICT development and literacy in that area. By doing so, the ultimate goal would be to use ICT as a tool to help improve the living standards of the villagers in the rural area of Sarawak.
4.2 Methodology of investigating the role of motivation towards performance

A 45-item questionnaire is developed based upon the widely recognized MSLQ and SMTSL, which are modified accordingly to suit the context of the study of the RIGHT programme. MSLQ was chosen due to its positive results of reliability generalization studies that shows MSLQ is effective for different types of samples [85]. MSLQ is shown to be suitable as it was tested across different disciplines which consist of foreign language, computer science, natural science, social science and humanities [97]. The MSLQ scales are also proven to be robust with the completion of two confirmatory factor analyses which indicate reasonable factor validity. This aside, it also shows good internal consistency and the scale is selected based on their Cronbach alpha reliability score and relevance towards the study [97].

A total of 19 candidates from the first batch of the programme took part in the questionnaire but only 17 was considered usable as two other respondents were bias and unusable, as the same answer was selected for every question. The omission of the bias ensures that the correlation result will not be skewed. Later on, another 9 candidates from the second batch took part in the questionnaire. Items are scored based on a six-point Likert scale ranging from 1= strongly disagree to 6 = strongly agree. Some of the questions are negatively phrased hence the scoring would also be reversed. The weight of the score for all the items are equal and since there are 45 items, the maximum score of the questionnaire would be 270 points. The scores of each scale are calculated using the mean of the items used to make up the scale. Taking the self-efficacy scale as an example, the scale score of the candidate calculated by adding up all the seven items followed by obtaining the mean. Spearman’s rank correlation is used to determine the correlation between each of the scale and total questionnaire score with the two assessments score of the candidates. Since the score is not evenly distributed and considered to be ordinal scales, a non-parametric approach such as Spearman’s rank correlation would be more suitable.

The performance of the candidates is measured based on the results of the regular assessment result for each topic. Assessment 1 is made up of assessing office suite usage skills such as Microsoft Office and OpenOffice. The different programme that was being assessed includes Microsoft Word, Excel, PowerPoint, Access, OpenOffice Writer, Calc, Impress, and Base. Assessment 2 covers a more extensive scope of more complicated software, theory, and practical skills. The assessed subjects are namely Adobe Photoshop, Flash, Dreamweaver, Microsoft Office Publisher, HTML, Data Communication, ICT System, Application Development, Troubleshooting & Maintenance, SDLC, and e-commerce. The assessment score is taken from the mean of the total score of the subjects mentioned earlier to represent the candidate average performance in the two group of assessments. The score of the candidates is classified into three categories whereby 60 and below is considered as poor performance, 61-80 as average performance and 81
and above as good performance. Below 50 is known as the failing score for each of the assessed subject. In order to demonstrate the larger picture, the four motivation scales and study strategy scales are grouped as motivation factor and study strategy factor respectively. The average score is calculated by taking the mean after the addition of assessment 1 and assessment 2. Spearman’s rank correlation coefficient test is again used to determine the correlation between the average score with each of the factors namely motivation factor, study strategy factor, and the combination of the two factors. This provides a better overall view of how the factors affect the candidate’s performance in the RIGHT programme.

The first four are the set of motivation scales and the next four are the set of study strategies scales. The section below includes some brief explanations for each of the scales used in the questionnaire.

4.2.1 Motivation scale

A) Self-efficacy

This scale refers to the self-appraisal of an individual’s ability, towards accomplishing a given task or job. It also involves the personal expectancy, confidence, and self-belief in their ability to do well for the task or job given. One example of the item asked was: “I expect myself to master the skills that are taught in class”. This scale has an Alpha of .93 and is found in item 1 to 8.

B) Perceived learning value

It refers to the perceived usefulness of the task or material by the individual towards their self-development. Hence, higher task value should also mean a higher level of involvement in the person’s learning, because a higher level of perceived importance generally leads to higher interest level. One example of the item asked was: “I think what is taught in the RIGHT programme is important because I can use it in my daily life and help others. This scale has an Alpha of .90 and is found in item 9 to 15.

C) Intrinsic goal orientation

The involves an individual’s general goal, participation for the challenge, curiosity, and mastery with the aim to learn or experience new things. It is more about the individual’s desire for self-improvement or contribution towards the greater good, rather than for the sake of just finishing the task or to achieve the desired result. An example of the item asked was: “I prefer materials (exercise and assignments) that makes me interested although it can be difficult to learn.” This scale has an Alpha of .74 and is found in item 16 to 20.
D) Extrinsic goal orientation

This refers to the individual’s participation for reasons such as acquiring good grades, rewards, and competition which are the external motivating factors for completing the task. It means they are more motivated to obtain the desirable outcome. One example item asked was: “Getting good result is more important for me than understanding the topic well.” This scale has an Alpha of .62 and is found in item 21 to 25.

4.2.2 Study strategies scale

A) Learning environment stimulation

It refers to the class environment stimulation such as the materials, trainers’ teaching, pupil interactions, and class condition that may affect the individual’s performance. It would help us understand whether external factors outside of the individual’s control, would become an influence towards the performance. This scale was taken from the SMTSL questionnaire. An example of the item asked was: “I love to participate in class because the content is exciting and helpful.” This scale has an Alpha of .69 and is found in 26 to 30.

B) Time management and study environment

It involves the individual’s time management for studying and also their study environment outside the class. Time management would be how the individual set aside time for revision regarding what is taught and how they plan to get their studies done effectively. Study environment involves the place where the individual does their work or revision where a recommended environment would be a place that is quiet and without distractions. An example of one of the items asked was: “I often study at a place where I can concentrate properly without distractions.” This scale has an Alpha of .76 and is found in item 31 to 36.

C) Effort regulation

Involves the self-management of effort and commitment to achieve the desired goal regardless of the difficulties or distractions faced. It can be while dealing with a boring task, individuals with good effort regulation are able to complete it which demonstrates discipline. One example of the item asked was: “Even when the materials are uninteresting to me, I still try my best to finish.” This scale has an Alpha of .69 and is found in item 37 to 41.
D) Peer learning

This refers to the collaboration between peers to share insight into the material and what is taught. It also shows teamwork and willingness to learn or teach others which helps reinforce the understanding of the topic among the students. Some participants would prefer group learning while others feel that it is a distraction to them. An example of the item asked was: “I like to discuss the materials together with my classmates to exchange ideas and opinions because it helps me understand better.” This scale has an Alpha of .76 and is found in item 42 to 45.

4.3 Results and finding

![Figure 4.1: Assessment 1 of candidate’s average](image1)

Based on Figure 4.1, the graph shows that majority of the average score of the RIGHT candidates for assessment 1 are between the ‘61-70’ and ‘70-80’ range, both with 8 candidates. A total of 4 candidates scored excellently to achieve an average score of range ‘81-90’, while only a single candidate in the range of ‘51-60’ score. No candidate scored in the score range of ‘50 or below’ and ‘91 or above’. The above results shows consistency of the candidates to score above average to good results for assessment 1.

![Figure 4.2: Assessment 2 of candidate’s average](image2)
As compared to Figure 4.1, the results showed in Figure 4.2 generally depicts a lower average score among the candidates. Figure 4.2 shows that majority of the candidates achieved an average score for assessment 2, in the range of ‘51-60’ at 11 candidates. It is followed by 6 candidates for the next score range of ‘61-70’. Only one candidate achieved excellent results in both the assessment score range between ‘71-80’ and ‘81-90’. The poorer score from the candidates in assessment 2 is likely due to higher level of difficulty of the software and skills taught. Similarly to Figure 4.1, the assessment score range of ‘50 or below’ and ‘91 or above’ yet again showed no candidates.

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Assessment 1</th>
<th>Assessment 2</th>
<th>Questionnaire score</th>
<th>Self efficacy</th>
<th>Learning value</th>
<th>Intrinsic</th>
<th>Extrinsic</th>
<th>Learning environment</th>
<th>Time &amp; study environment</th>
<th>Effort Regulation</th>
<th>Peer learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>1.00</td>
<td>0.516†</td>
<td>.803†</td>
<td>.152</td>
<td>.406†</td>
<td>.516†</td>
<td>.537†</td>
<td>.358</td>
<td>.637†</td>
<td>.538†</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.004</td>
<td>.000</td>
<td>.501</td>
<td>.043</td>
<td>.034</td>
<td>.026</td>
<td>.157</td>
<td>.025</td>
<td>.236†</td>
<td>.026†</td>
<td></td>
</tr>
<tr>
<td>Assessment 2</td>
<td>.519†</td>
<td>1.00</td>
<td>.607†</td>
<td>.423</td>
<td>.037</td>
<td>.237</td>
<td>.482†</td>
<td>.324</td>
<td>.462†</td>
<td>.361†</td>
<td>.195</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.034</td>
<td>.010</td>
<td>.099</td>
<td>.887</td>
<td>.381</td>
<td>.059</td>
<td>.205</td>
<td>.050</td>
<td>.241†</td>
<td>.452†</td>
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</tr>
</tbody>
</table>

Table 4.1: Batch 1 correlation of questionnaire score and scale score with candidate’s performance

The results in Table 4.1 shows the correlation between the questionnaire score and scale score with the batch 1 candidate’s performance represented by assignment 1 and 2. The questionnaire score shows a significant correlation with both assignment 1 (r = 0.803, P < 0.01) and assignment 2 (r = 0.607, P< 0.01). Assessment 1 shows more correlation with the different scale as compared to assessment 2. For assessment 1, extrinsic goal orientation (r = 0.516) shows the best correlation between the motivation scale and peer learning (r = 0.538) having the best correlation among the study strategy scales. The rest of the scales that shows favorable correlation includes learning value (r = 0.495), intrinsic goal orientation (r = 0.516) and time management & study environment (r = 0.537). As for Assessment 2, only extrinsic goal orientation (r= 0.482) and time management & study environment (r = 0.482) shows strong correlation. The rest of the scale shows no meaningful correlation to the assessment. Both assessment 1 and 2 also shows the presence of good correlation (r= 0.516).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Correlation Coefficient</th>
<th>Average score</th>
<th>Motivation</th>
<th>Correlation Coefficient</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td></td>
<td></td>
<td>1</td>
<td>.847**</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average score</td>
<td>.847**</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: Correlation of motivation factor with the average score

Table 4.2 shows a significant correlation between the motivation factor with the combined score, having a correlation of r = 0.847. It proves that the motivation scales as a whole has a large impact towards the overall assessment performance of the candidates during the programme.
Table 4.3: Correlation of study strategy factor with the average score

Table 4.3 shows the correlation of study strategy factor and combined score at a reasonably high level of $r = 0.617$, despite showing a weaker correlation as compared to the motivation factor.

Table 4.4: Correlation of motivation and study strategy factor with the average score

Table 4.4 shows the correlation of the whole picture of the MSLQ questionnaire which is the combination of motivation factors and study strategy factors with the average score. The table shows good correlation with a value of $r = 0.714$.

Figure 4.3: Average score with motivation and study strategy factor
Figure 4.3 shows the correlation between the average score with motivation and study strategy average of every candidate. With a scale of 1(lowest) to 6(highest) for the motivation and study strategy average, the linear upward trend depicts positive correlation and is the visual representation of Table 4.4. There are however about two candidates that deviate from the trend by having good motivation and study strategy average but poor average score and vice versa. It is also worth to note that no candidates failed with the average score of below 50.

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Assessment 1</th>
<th>Correlation Coefficient</th>
<th>Sig (2-tailed)</th>
<th>Assessment 2</th>
<th>Correlation Coefficient</th>
<th>Sig (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Questionnaire score</td>
<td>Self efficacy</td>
<td>Intrinsic</td>
<td>Time &amp; study</td>
<td>Questionnaire score</td>
<td>Self efficacy</td>
</tr>
<tr>
<td>Assessment 1</td>
<td>.765*</td>
<td>.698*</td>
<td>.919*</td>
<td>.709*</td>
<td>.557</td>
<td>.214</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>.119</td>
<td>.581</td>
<td>.050</td>
<td>.009</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

*Table 4.5: Batch 2 correlation of questionnaire score and scale score with candidate’s performance*

Subsequently, the correlation study was again repeated for 9 candidates from the second batch of the programme as shown in table 4.5. Motivation scale that did not show any correlation to the candidate’s performance for both the assessments was removed from the table. Unlike the first round of the study, the questionnaire score showed correlation to assessment 1 only. The scales that showed good correlation with assessment 1 are self-efficacy ($r = 0.698$), intrinsic goal orientation ($r = 0.919$), and time management & study environment. While for assessment 2, only intrinsic goal orientation ($r = 0.667$) and time management & study environment ($r = 0.801$) showed good correlation. Similarly to the first round of the study, assessment 1 shows more positive correlation with the scales as compared to assessment 2. While the correlation with both intrinsic goal orientation and time management & study environment scale were also found for the first round of the study, positive correlation with the self-efficacy scale is only present for the second batch of candidates.

### 4.4 Discussion

Based on Figure 4.1, it is shown that a majority of the candidates achieved an average performance with the assessment score within the range of 60-80. Most of the candidates were able to accomplished high scores in subjects such as Microsoft Word and OpenOffice Writer. This is likely the result of the subjects being of lower difficulty and requires less effort to do well. The weakest subject scored by the candidates was the Microsoft Access, with as many as five candidates failing to pass the assessment. Only one
candidate performed below average in the 50-60 score range. The mean score for assessment 1 is at 72.35. This demonstrates that the candidates have generally performed well in the assessment. However, Figure 4.2 showed a large contrast as compared to Figure 4.1 as the candidates have generally did poorer, with the majority of the scores within the 51-60 score range. Only 6 candidates managed to performed better than the rest within the 51-60 range. This is considered to be a drastic drop of performance between the two assessments. Due to the nature of assessment 2 compromising of various skills and more complicated software tools, the drop of score is expected as compared to assessment 1. Only one candidate managed to achieve a similar score for both assessments, while the rest showed a decline in performance confirms the difficulty difference between the two assessments.

The results in Table 4.1 shows that the questionnaire score has significant correlation to both assessment 1($r = 0.803$, $P < 0.01$) and 2($r = 0.607$, $P < P 0.01$). This is not surprising as it confirms the hypothesis that candidates with better motivation and ideal study strategies will be more likely to perform better in their assessment. For assessment 1, it is shown that extrinsic goal orientation has the highest correlation ($r = 0.537$) among the motivation scales and peer learning ($r = 0.538$) among the study strategies scale. Based on this result, the study reveals that obtaining good grades and peer learning is the main driving force for the candidate to do well and achieving a better result in subjects for Assessment 1. The subjects in assessment 1 as mentioned earlier are related to office suites software which is the less complicated and more commonly used as compared to the subjects in Assessment 2. Hence, it is much easier for candidates to help each other in the understanding of the subject which explains the high correlation of peer learning with performance. The high correlation of learning value can be explained that due to the category of subjects in Assessment 1, candidates who for example perceived Microsoft word to be more important than Microsoft Access would without doubt show more effort in mastering the former. The strong intrinsic and extrinsic goal orientation shows that the candidates who did well, are motivated by both wanting to attain mastery in the skills taught and also score good grades. The time management and study environment scale show good correlation with both assessments emphasize the need for a good studying environment for conducive studying, and also being able to manage time in prioritizing their study.

The Spearman’s Rank correlation analysis of assessment 2 however provided less correlations with the scales used in the study, with only extrinsic goal orientation($r = 0.482$) and time management & study environment ($r = 0.482$) showing a positive correlation. The learning value scale was found to have the weakest correlation for assessment 2 ($r = 0.037$). The study proves that since assessment 2 is more diversify and complicated due to the various types of skills being assessed, it is more difficult to pinpoint the exact motivation scales that are linked to their performance. The competitive spirit and desire to perform well in
the learning process is universally accepted to be present and is represented by the correlation of the extrinsic scale. Time management and study environment also play a major role whereby candidates that are able to do their revision regularly in a conducive environment are more likely to score better. It is safe to conclude that these two scales are largely impactful on candidates that are learning practical skills, IT theories and designing software which are subjects not included in Assessment 1. It also means that since the type of subjects in both assessments can be contrastingly different, only certain motivation type and study approach can be applied to both assessments. The good correlation shown between assessment 1 and 2 shows the consistency of the candidate’s performance despite the difference in difficulty and skills. It is worth noting that self-efficacy, effort regulation and learning environment stimulation scale shows no significant correlation with both assessments. This finding was surprising as early hypothesis would assume that scales such as self-efficacy and effort regulation would be among the major influence towards the performance, as it deals with the candidate’s personal belief and self-initiated effort to do well.

For the repeat study with the second batch of candidates, the scales that showed good correlation in Table 4.5 with the assessments were self-efficacy, intrinsic goal orientation, and time management & study environment. It verifies some of the correlation results from the first study especially for the time management & study environment scale, as correlation is found in both assessments over the two round of studies carried out. This again raises the need for selecting candidates with good time management skills, while at the same time providing them a studying environment that is a clean and conducive environment to facilitate the learning process. Time management skills for learning could also perhaps be taught to help the candidates better make use of their time. Correlation of the intrinsic goal orientation scale found with both the assessment points to the fact that the desire for self-improvement and mastery over the topics taught, is indeed a strong motivating factor for high performing candidates. The presence of correlation with the self-efficacy scale in this round, is not found during the first round of the study conducted. It could be explained that candidates for this round that believed they could perform well at the start of the programme, are more likely to achieve a better result as compared those who do not. Candidates may have also put in more effort towards learning, due to the belief towards their ability to perform well. The effort regulation and learning environment stimulation scale have yet again shows no significant correlation in this repeat study. This means that it is safe to say that these two scale are not suitable to be used as a guideline for the candidate selection process.

Both motivation factor and study strategy factor have shown to have an impact on the candidate’s overall performance in the RIGHT programme. By comparing table 4.3 and table 4.4, it can be concluded the motivation factor (r= 0.847) has a better correlation to the candidate’s overall performance as compared to
the study strategy factor $r=0.617$. This means that despite both the factors have an impact on the performance, motivation has a larger impact comparatively. This is expected as study strategies can differ greatly from one candidate to another and there is no perfect strategy that suits everyone for doing well. Besides, one particular study strategy such as doing revision daily might not be equally effective for everyone. Table 4.4 sums up the overall outcome of the questionnaire by measuring the correlation of the candidate’s overall performance with the combination of motivation and study strategy factor, which resulted in a high correlation level of $r = 0.714$ and $p < 0.01$. This data also validate the usage of the MSLQ questionnaire that has been often found to be successful in obtaining good correlation from both motivation and study strategy with the candidate’s performance. Figure 3 further illustrates the full picture of this study by mapping out every candidate’s overall average score against their motivation and study strategy average score. Majority of the candidates are found to be between the 60-70 average marks for the whole programme. The figure depicts an upward linear trend which confirms the alternative hypothesis that candidate with good motivation and ideal study strategy will generally do better as seen in the overall average score. It is visible from the figure that there are some candidates that are far from the linear line which proves that the questionnaire cannot be totally accurate in predicting the candidates' performance. This could potentially be due to the presence of biases and other various factors that could impact the candidate’s performance which will be further discussed.

4.4.1 Biases issue

Despite the various steps taken to improve the questionnaire, there will still be some potential weakness regarding the data accuracy due to biases. The first and most common issue would be the central tendency bias where candidates would refrain from providing extreme response hence tend to select the middle option [112]. This fence-sitting mentality is commonly found as participants of the questionnaire might be afraid to offend or being out of the norm by playing it safe to choose a neutral answer. The action taken regarding this issue would be to remove the “middle ground” option by using an even number range of answer choice. The other issue would be the acquiescence bias where the participant would agree with statement hence only selecting the agreeing option. To solve this, some negative statements were introduced which would make the bias obvious if contradicting answers were found [113]. The next issue would be the social desirability bias whereby they choose the options that are generally more acceptable as society beliefs to portray themselves as an ideal student [114]. This bias was clearly found to be present as one of the questionnaire was found to have a 6 (strongly agree) on a positively worded item and 1 (strongly disagree) on a negatively worded item. That bias would be hard to solve, and it is suggested that further observation from trainers, confirmation from assignments and test result, and further interview to validate the choices selected. A limited sample size is also an issue in this study as inaccuracy of data might affect the result of
the analysis. Biases would cause a large skewed in the analysis which is the main concern due to the small sample size. One solution taken towards reducing this issue was that the study was repeated with the second batch of candidates to compare and verify the results of the first round of study. Unfortunately, this issue could not be totally eliminated as the programme accepts a limited number of participants each batch so the sample size is small.

4.4.2 External factor influences
Besides the two factors that were discussed in the study, it is fully known that many other various factors could contribute to some level of impact directly or indirectly, towards the candidates’ performance in the programme. Beaumont-Walters and Soyibo in 2001 state that the socio-economic background (SEB) of the student has a large influence on their performance [115]. This means that factors such as the gender, age and financial background, parental support of the candidate could possibly play a role in the outcome of their performance. The diversity of candidate background in the programme from different villages and ethics would also have a different attitude towards the ICT learning process. Besides that, the emotional and social factor of the candidate also could also have an impact on their performance. A study done by Pritchard & Wilson found that social health and emotional factor have an impact on students’ performance [116]. This is further proven by Leafgran who have concluded that students who are healthy socially and emotionally have better chance to do well in college [117]. External factors that also would influence the candidate's result could be the environment during the programme itself such as the trainer’s competency, teaching methods, material quality and facilities provided. For example, something as simple as a hot learning environment would make it difficult for the candidates to concentrate in class, possibly affecting their learning capabilities and performance. Hence it is also important to evaluate the environment of learning to ensure consistent improvement is made, to provide the best possible support for assisting the candidates in their learning.

4.5 Summary
The main purpose for the use of the result found in this study as mentioned earlier, is to be a guideline for the candidate selection process of the RIGHT candidates. Ideally, it would help select future candidates that are highly motivated towards the learning of ICT and contribution towards ICT growth in their rural community. The selection process is highly crucial as it is identified as one of the key factors in determining if the programme successfully achieves its goal. Based on the two rounds of study carried out, the key factors that is found among high performing candidates are those that are motivated by intrinsic goal orientation and those who have good time management and environment to do their study. Other scales
that have a moderate impact towards their assessment performance includes self-efficacy, learning value, extrinsic goal orientation, and peer learning.

In accordance to the goal of the RIGHT programme to bridge the digital divide, it requires successful candidates that are able to provide ICT services for their rural community. It is based on the hypothesis that candidates with a certain high motivation factor and good study strategies would do well in the programme. Whereby after the programme, they would be able to spearhead the ICT development in their respective village. Besides, the results give us a better idea of the type of motivation and study strategy that influence the various subjects in the RIGHT programme. This insight also enables the fine tune of the subjects, such as equipping the candidates to manage their time well. The performance of the candidates could also be due to various other external reasons such as the complexity of the subject, incompetent trainer, insufficient time for programme duration, or even poorly designed materials that are difficult to understand. The follow up with the RIGHT alumni is also needed to monitor their progress after completing their training. Ideally, some of the trained alumni would make use of the skills acquired by providing ICT training and services for their rural community. Others might successfully find a better job with their additional ICT skillsets. This too is also considered a success, albeit to a lesser degree as their contribution is considered to be localized, and impact to the community would most likely be minimal. An idea for a follow up study could be conducted, which is regarding the impact of the programme on the living standard of the rural community in the participant’s hometown. It most likely be a qualitative study at the grassroots level by measuring the level of impact the villagers have received, before and after the RIGHT candidate starts an ICT centre or provides ICT services. The data collected could be used to further fine tune the RIGHT programme to ensure the candidates are well equipped to benefit their community in the future.
Chapter 5 Gamification for Sustainable Engagement

5.1 Introduction

Based on pilot research involving the traditional methods of data collection as discussed in chapter 3, we have found out that the method used for the data collection process was inefficient and requires extensive resources of time, money and effort. Besides, follow-up with the respective alumni has been limited up to the point of the study. As a result, this chapter aims to propose a sustainable solution towards engaging more alumni to be part of the study, improve user experience, and enhance the response rate of the data collection. The proposed method for engagement includes the adoption of social media and the use of a gamification prototype system. Implemented together with an online survey, the different components forms the proposed solution for the sustainable data collection. The use of gamification for sustainable engagement will also be evaluated and analyzed in the study. The respondents in phase 1 are from two batches who were undergoing the RiGHT programme. For the study of phase 2, all the alumni that used to be part of the programme will be the target group and respondent.

Survey plays a huge role in collecting data for nearly all kinds of research. Traditionally, the common data collection practice among researchers for surveys are mainly carried out either by telephone or mail. However, since the turn of the millennium, the internet has increasingly grown to become a common tool for communication over the years. According to internet live stats, the internet penetration rate of Malaysia was at 21.4% during the year 2000, which increased dramatically to 68.6% in the year 2016 [118]. Due to the rise of internet adoption for personal use, an online survey has progressively become a viable alternative to replacing the traditional mail survey. Based on a literature review conducted by Ilieva et al. in 2002 [119], it was found that surveys conducted online have an average response time of 5.59 days, as compared to the average of 12.21 days by mail surveys. It is also not surprising that journals from multiple disciplines have been increasingly published data that were collected online [120]. The response rate of both mail and online survey has always been an issue where many researchers are finding it difficult to improve upon.

5.2 Methodology for improving data collection process and engagement through social media and gamification

Data collection regarding the RiGHT alumni were collected every quarterly to keep a profile and timeline regarding their information such as employment status, salary and also ICT contribution to the society. Based on earlier survey responses, the response rate and response time of the survey were poor, whereby the inadequate data makes it difficult to provide conclusive evidence for the impact study. Hence, a
proposed solution using online survey was conducted for the study to determine its effectiveness in improving the response rate and time, in comparison to a traditional mail survey. Social media for engagement and gamification were experimented upon with online survey, in an effort to further boost the response rate. For both the data collection process, a reminder to the alumni would be given two weeks after sending out the surveys for those who have yet to participate in the survey. The survey submission cut-off date is at the end of week 4 to ensure ample time is given but yet with some sense of urgency. This method is loosely based on core drive 6 of the Octalysis. The response rate of the different collection process, characteristic of data affecting response rate, and issue faced by both the proposed and traditional methods were compared and discussed.

5.2.1 Alumni engagement techniques

Follow up is known to be one of the most basic forms of engagement. The adoption of alumni engagement and survey techniques was hypothesized to be effective in improving the reach of the targeted group, the rate of response and response time for the survey. Alumni engagement essentially involves the constant communication and relationship building with the alumni. At the start of the engagement with every alumnus, the purpose of the study is explained to them, while they are made aware of being part of contributing towards the improvement of the programme and also the data collection process. It provides them a solid meaning or purpose towards ensuring that they are helping for a good cause, which would benefit those would are going to be trained just like them in the future. While it may not be part of a gamification feature, it employs the concept of epic meaning which is based on core drive 1 of the Octalysis.

A) Social network sites and messaging apps

Traditional engagement methods through phone calls or SMS faced some critical issues such as their number no longer in use and calls went unanswered despite numerous attempts. It also potentially incur a fair amount of cost to consistently follow-up with a big group of alumni, making it unsustainable for the long term. In an effort to increase the follow up of the alumni through an alternative method, the research team decided to adopt social network sites as a tool for improving engagement with the alumni. The alumni of the RiGHT program were found to have a decent adoption rate of social media at 56% (50/89), with a majority of them being particularly active on popular social media like Facebook and Instagram. Similarly to the study conducted by Kayam and Hirsch [28], reaching the alumni and staying in touch consistently are now made possible through social media. Previously, some of these alumni were nearly unreachable due to a combination of obstacles such as distance, cost, and changes in contact information. Hence, Facebook being the most commonly adopted by the alumni was selected for the study.
Social media were also proposed due to the ease of contacting the alumni regularly at zero cost and eliminating geographical difficulties for travel. This makes social media a very attractive alternative to engaging the alumni as compared to conventional methods like phone calls and SMS. Social media such as Facebook enables the constant follow up of the alumni through the build in chat, group system and a personal wall that depicts the activity of the person. When Facebook was first used to disseminate information and conducting the survey, a RiGHt alumni group were created and the target group was added as shown in Figure 5.1. All the alumni were first contacted individually and only added to the group after obtaining their consent. The alumni now could now stay in contact with their peers and also with alumni from other batches. It becomes a platform for interaction, content sharing, alumni update, and feedback among the alumni and with the research team. It could also potentially encourage collaboration of projects or initiatives between the alumni especially those who come from the same area.
Figure 5.2 demonstrates an example regarding the distribution of the online survey to the alumni in the group. Instructions were given in Bahasa Malaysia as it is the most commonly understood language among the target group while the survey form is bilingual, in both English and Bahasa Malaysia. This method of distribution was hypothesized to be more effective, as it enables the alumni to respond towards any inquiry and even to indicate they have successfully completed the survey. This method of one to many is vastly different from previous methods used such as through e-mails or by traditional mail. The seen feature for the Facebook group is also a helpful tool to indicate how many of the alumni have seen the survey being posted. In this particular scenario, bonus points were awarded to participants who managed to fill up their survey form within the first week the survey was posted on the group. It is based upon the core drive 7 and 8 of the Octalysis. The survey is carried out with the alumni every quarterly, where they are required to provide their latest feedback, achievements, and updates. Through this, the research team also aims to use intrinsic motivate the alumni intrinsically through being a part of improving the data collection process. Hence, no tangible rewards is awarded during the study.
Subsequently, in an effort to further improve the response rate, the survey was also distributed to every alumnus (as shown in Figure 5.3) for those who have yet to complete the survey. It is sent to the alumni personally on either Facebook messenger, Telegram, SMS or WhatsApp. This was done especially for those who were not very active on social media site like Facebook itself. It was shown to be very effective as the target group were very responsive towards one to one communication, and were openly willing to acknowledge their completion of the survey. For those who did not respond to both the distribution methods of through the Facebook group and individual chats, a reminder was provided. The research team believes that sometimes chats or group posting could genuinely be overlooked. For alumni with a very limited internet connection or difficulty accessing the online survey, SMS through phone and a word file version of the survey questions were sent to the alumni. When the survey is answered, the research team manually enters their data into Google Form on their behalf.
Besides, the Facebook group also provides a platform for the alumni to provide their latest update regarding their achievements and plans regarding their service to the community. The alumni are encouraged to share activities they organized or even issues that they have faced while carrying out their services or ICT center. Other alumni would be able to voice their opinions or provide advice in handling certain issues based on similar experiences from the past. Figure 5.4 shows an example of an update post from one of the alumni of the group regarding an upcoming ICT camp that will be conducted by him. The camp would be conducted in a school, mainly to educate the students on the use of basic ICT software such as Microsoft Office. This report of achievement by alumni is encouraged as it helps the research team and fellow alumni be constantly updated on their recent activity. This becomes a great motivation and role model to their peers who are planning to take a similar role in helping their community. It could also inspire the other alumni to either follow their footsteps or even start a collaboration effort in their respective villages.

Figure 5.5: Example of technology information sharing among the alumni

The use of social media not only helps the research team to maintain consistent engagement with the alumni, it also creates a platform for communication and knowledge sharing with and among the alumni. The alumni are encouraged to post and share the latest technology news in the ICT industry while at the same time create healthy discussions among the alumni regarding the news. Figure 5.5 shows an example of information sharing regarding the latest phone release by one of the alumni. It enables discussions among the alumni regarding the latest news in the tech industry, where their opinions and reviews are being shared and discussed among their peers. Experience alumni are also given the opportunity to share their experience.
and guide those who are newly graduated from the programme. This is especially helpful especially for those who are planning to start their own ICT centre.

B) Gamification

A prototype website using gamification concepts were created as a non-monetary incentive for the alumni to fill in the online survey. The non-monetary incentive approach makes the approach more sustainable over the long term. The use of gamification is hypothesized to provide an intrinsic motivation for the alumni to complete the survey conducted. The prototype is a separate website that is not linked to the online questionnaire, whereby as of now the data are being manually entered into the system. The hypothesis for the adoption of gamification is to motivate the alumni to fill up the survey and to enhance their user experience. In an effort to boost response rate of the online survey, this experiment would allow us to understand how the alumni respond towards the intrinsic nature or intangible incentives of gamification. The following gamification mechanics are modified based on the simple gamification demo developed by Nic Mulvaney.

Figure 5.6 is an example of the default starting profile of every alumnus before they have submitted any survey. Every alumnus (respondent) would start at level 1, with zero score or progression in the beginning. The respondent’s status, level, icon (avatar) and total score are also shown in this simple profile page. Initially, all the alumni would also be given the status or rank of a turtle, indicating they are still new. The goal of every alumnus is to earn as many points as possible by filling up the survey and successfully submitting it. The points accumulated would enable the alumni to increase their total score, level up their profile, and also enhancing their status. Gamification helps to create competition among the alumni, which motivates them to do better and win more points than their peers. This feature is based on the core drive 2, 4 and 5 of the Octalysis.
From Figure 5.7, the leaderboard shows the alumni (respondent) who have submitted the online survey and were awarded 100 points each for their completed task. This feature is based upon core drive 2, 5 and 8 of the Octalysis. Subsequent surveys that are submitted would also be awarded a certain amount of points. Logically, an alumnus who has completed the most survey would be at the top of the leaderboard due to earning the most points. This creates competition between the alumni as it motivates them to be better than the rest of the peers, which is part of core drive 5. Figure 5.9 shows that respondent 2 to be the first person to complete two surveys, hence is currently leading the leaderboard. Occasionally, random bonus points would be awarded to alumni who managed to complete and submit the survey form early and within the time allocated. This adds to the unpredictability nature of incentives, which would motivate the alumni to submit their questionnaire early in order to avoid missing out. The randomness of the bonus points, and the fear of missing out on these additional points are based upon core drive 6 and 8 respectively.
Next, figure 5.8 depicts the progression of the profile for respondent 5 after complete a single survey. In this scenario, the points were awarded for successfully completing a survey. It now grants the participant to achieve level 2 with a new icon or avatar, from a turtle to currently a sheep which indicates progress. The level score also shows the remaining points needed to reach the next level, while the total progress indicates the overall progression to the endpoint which is at level 20. The levels become progressively harder as it requires increasingly more points to complete the level. This means that the progression from level 9 to 10 requires substantially more points as compared to the progression from level 2 to 3.

![Figure 5.9: Examples of achievement badges](image)

The final gamification mechanics of the prototype is the use of achievement badges such as the one shown in figure 5.9. It is based upon core drive 2 of the Octalysis. Similarly, like the ones found on gaming platforms such as Steam or Xbox Live [121], various kinds of badges are designed to be unlocked once a certain criterion is met. Figure 5.9 shows three different badges of varying difficulty to earn. The first badge on the left is awarded to the participant on their first completed survey form, which is the easiest to be earned. The second badge in the middle requires the participant to successfully complete three successive surveys in a row without missing out on any survey. The last badge is the toughest to be earned, which is awarded to the participant who is currently having the total highest points among the alumni on the scoreboard. In theory, the toughest badge to earn is hypothesized to be the most sought-after badge among all the other badges for the participants.

In a scenario where an alumnus have yet to fill in any questionnaire, their profile will be similar to the start depicted in figure 5.6. Subsequently, each time the fill in a questionnaire, points will be award to their total score which will be reflected on the leaderboard. Their profile, which consist of the icon, level, and status, would change accordingly based on the points every time it surpasses the threshold for each level. The alumnus could also earn badges if the criteria are being met. Different badges have different criteria, each with different difficulty levels as the alumnus begins to be more active towards submitting the required questionnaire. The gamification mechanics included in this system are leaderboard, levels, score system, icon and status, and total progression. While none of the gamification mechanics has any tangible value, but they are indeed a source of pride to be one of the best recognized among their peers. Hypothetically,
the gamification system would become a source of motivation for the alumni to do well in comparison to their peers. This would motivate them to become more willing towards participating in the reporting of their progress through the online questionnaire.

C) Reminders

Next, we investigate the effect of reminders towards the alumni. Reminders were given to all the alumni who have not submitted their survey by the end of week 2. Reminders were used for all the data collection methods that were conducted. Due to the possibility of the alumni who unintentionally skipped or forgotten about the posted survey, reminders is crucial towards getting the attention of the alumni to fill up the survey. Reminders have regularly shown to be among the best techniques for improving the response rates of both mail and online surveys [122], [123], [124]. The researchers do however warn against using it too frequently as it becomes interpreted as spam or annoying. The theory behind is that when a certain level of friendship is being established, the alumni would be more likely to willingly participate and contribute towards the survey, which again points to the importance of alumni engagement.

5.2.2 Analysis methods

A) Fisher’s exact test

The Fisher’s exact test was chosen as it is ideal for determining associations between two categorical variables for small sample size, unlike the chi-square test. Demographic variables of the respondents such as batch, income, employment status and ICT service were used as the variables. The demographic variables were tested against the mail survey and online survey method (with gamification). The purpose of using Fisher’s exact test is to identify the variables that are responsible for the preference towards the data collection methods. Table 5.1 and equation 5.1 demonstrates the formula of the Fisher Exact test, which was carried out using SPSS.

Batches were separated into two categories, the batch before the study (1-8) was conducted, and the batch after the study (9-10) was conducted. Since the study was conducted over the period of the RiGHT programme for batch 9 and 10, alumni from that batch have been accustomed to completing online surveys that were conducted for understanding the role of motivation in their performance which is chapter 5 of the thesis. Besides, the assumption is that alumni from these batches are more willing to participate, having worked with the researcher throughout their programme. For the income group, it is split into two categories. Those without any income or earning below RM1000 are classified as the low-income group. It is worth noting that the minimum wage in Sarawak is at RM920 [124]. Those earning income of more than RM1000 is classified as the ideal income group. Age was classified into two categories, 25 and below, and
25 to 40. The World Health Organization (WHO) and the Department Of International Economic And Social Affairs classify the age range between 20-24 as young adults, while adults are in the age range of between 25-44 [125], [126].

<table>
<thead>
<tr>
<th></th>
<th>Mail Survey</th>
<th>Online Survey</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>a</td>
<td>b</td>
<td>a + b</td>
</tr>
<tr>
<td>Factor 2</td>
<td>c</td>
<td>d</td>
<td>c + d</td>
</tr>
<tr>
<td>Column Total</td>
<td>a + c</td>
<td>b + d</td>
<td>a + b + c + d (=n)</td>
</tr>
</tbody>
</table>

Table 5.1: Table of Fisher’s exact test

\[ p = \frac{\binom{a+b}{a} \binom{c+d}{c}}{\binom{n}{a+c}} = \frac{(a+b)! (c+d)! (a+c)! (b+d)!}{a! b! c! d! n!} \]

Equation 5.1: Formula of Fisher’s exact test

B) Odd ratio

Odd ratio is being commonly used for survey studies, specifically in the field of medical and social science. They can be used for case-control studies and also cross-sectional studies. Basically, the odd ratio is carried out by measuring the association between exposures with an outcome [127]. In this study, the purpose of odd ratio is to calculate the probability of how each of the characteristics affects the probability of each data collection method.

<table>
<thead>
<tr>
<th></th>
<th>Mail Survey</th>
<th>Online Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>a</td>
<td>c</td>
</tr>
<tr>
<td>Factor 2</td>
<td>b</td>
<td>d</td>
</tr>
</tbody>
</table>

Table 5.2: Table for Odd ratio

Based on scenario showed in Table 5.2 and equation 5.2, odd ratio is defined by the equation of:
Odd ratio (OR) of > 1 would indicate that the odds are positively associated, those increased the likelihood of occurrence. Likewise, OR of < 1 indicates that the odds are negatively impacted. For example, if OR = 2.0 in this case, it means that the possibility of ‘a’ (factor 1 responding to mail survey) is two times more likely to happen as compared to ‘c’ (factor 1 responding to the online survey). OR = 1 would mean that the factor does not have any impact towards the odds of the outcome.

5.3 Results and discussion

5.3.1 Data collection methods comparison

A) Traditional mail survey

For the pilot study, a traditional form of survey method using pen and paper were passed to the alumni during the team’s visit and were later asked to mail back the survey. Based on the results of the survey, the response rate was low and it was discovered that many of the answers were answered incorrectly based on the skip logic of the questions or were left unanswered. Other surveys conducted with the rural community but will not be discussed in the thesis, also faced the same issue. Some returned survey was deemed faulty as the answer provided by the respondent is flawed. Questions such as the ones shown in figure 5.10 and 5.11 was a big issue that affected the overall data quality with the use of traditional mail questionnaire during the pilot study. For example, question 15 shown in figure 5.10 is structured with skip logic or also known as conditional branching, which requires the participant to skip to question 17 if they answered option 2 or 3 which is “yes” to the question. The skip logic mistake occurs when the participant chooses either option 2 or 3 but also goes on to answer question 16, thus making the answers illogical and affects the quality of data.
Figure 5.10: Example of skip logic mistake

Figure 5.11: Example of unfilled mistake

Figure 5.11 demonstrates another common mistake whereby the participant does not check any of the answers and the particular question was left blank. In some cases, a single whole page of the survey was totally skipped by the participant. This could be attributed to the irrelevance of the question for the respondent, failing to understand the question or genuine mistake for skipping the question. Understandably, the missing data affects the overall data quality. The response time of this method was at an average of about 2 to 3 weeks, which is considerably longer as it would also take time for delivery from the rural town back to the city. Based on past studies, a mail survey was generally found to have better response rate as compared to an online survey. However, it would incur vastly more resources such as time and cost as discussed earlier chapters. No engagement solution was carried out during the conducting of the traditional mail survey as it was considered the pilot experiment of the study.

B) Online data collection through social media

The exact same survey questions of the printed version were later on recreated on Google Forms such as the example shown on figure 5.12. Initially, e-mail was the selected choice of distributing the online survey. However, this method was found to be ineffective as a majority of the targeted group were rarely active on their email account, while some of the mail sent might have ended up in the spam section. The research team decided to take a different approach, where the online survey was subsequently distributed through
the use of social media. Social media platform such as Facebook and chatting apps like WhatsApp and Telegram were used in reaching the alumni who are the target group of the research. Online survey forms such as Google Forms has become an increasingly adopted tool for the purpose of research, due to its versatility and solving issues faced by traditional mail survey. One significant advantage of online survey is it incurs little to no cost to implement. Since the survey needs to be consistently carried out, sustainability becomes a concern for the choice of the survey. Due to geographical reasons, getting the physical copy of the survey to the alumni would require substantial resources. Unlike mail survey which incurs some cost to the participant each time they mail back the survey, an online survey is free of charge and instantaneous. For this research, the adoption of the online survey also enables the ease of data gathering. The alumni are all given a link to fill the online survey directly, and the data would be recorded. Hence, no manual work is needed to transfer the data from each survey form into the computer needed for data analysis.

Figure 5.12: Example of an online survey with Google Forms

The use of online survey method also requires the participant to fully fill in the form, which ensures completeness of the data were made possible and the reliability of the analysis would undoubtedly improve. Since it does not require the researcher to input the data manually, data quality is much higher since human error is eliminated on the part of the researcher. Data quality is also further enhanced due to the capability of Google forms to prevent logic flaw which ensures that every order of the question is answered before
During the first round of data collection through a mail survey, many of the data were unusable as the existence of logic flaw was found in their form. The contradiction of the answers given affects the reliability of the data. Besides, the usage of an online survey in studies has also shown to have a much shorter response time. Since the data of the survey are instantaneously saved each time the participant submits the form. Unlike mail survey which takes a long duration to deliver back to the research team especially when the survey forms are posted to and from rural towns. This reduces the amount of time required to conduct the survey significantly.

However, online survey does have its own drawbacks with response rate being the main concern. Studies in the past have found that online survey tends to suffer from low response rate. While low response rate is a common issue for survey studies, an online survey is found to be generally lower as compared to a mail survey. In an effort to solve the issue of low response rate, a number of a proposed solution such as using social media, gamification and improving survey presentation will be discussed below. Another issue affecting the use of online survey is that the alumni either does not receive the invitation to participate or could not fill it due to various reasons. Technology and infrastructure gap is the most commonly cited issue among the alumni, as internet connectivity is either unavailable or too weak in their area to fill the online survey on Google Forms, while some alumni cited being inactive on social media. Others cited that their phone is incapable of performing the task and would require access to a computer or laptop to get it done. For this group of alumni, the research team adopted an alternative to using SMS, Telegram or WhatsApp to disseminate the questionnaires and gather responses from the alumni. Another concern that affects online survey that is distributed to the wrong target group especially if they are being publicly distributed on social media. To avoid this from occurring, the link is only given to the alumni who are in a private Facebook group strictly for those who have undergone the RiGHT programme. The identity of the respondent is also being checked to confirm their status as an alumnus before their data are included in the analysis.

5.3.2 Contactable alumni after engagement

<table>
<thead>
<tr>
<th></th>
<th>Contact rate</th>
<th>contactable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of study</td>
<td>31.7%</td>
<td>19</td>
<td>60 (up till batch 8)</td>
</tr>
<tr>
<td>After engagement</td>
<td>57.8%</td>
<td>50</td>
<td>87(up till batch 10)</td>
</tr>
</tbody>
</table>

*Table 5.3: Contactable alumni*

Based on table 5.3, it is shown that there is a noticeable improvement towards the numbers of contactable alumni after conducting alumni engagement, as compared to the start of the study. At the beginning of the research, only 19 out of the total 60 alumni from batch 1 to 8 were contactable at a rate of 31.7%. The
contact methods used were mainly through phone calls and emails. Those alumni were the ones that graduated from the programme even before the study began, and they were selected to participate in the preliminary findings of the face-to-face interviews and traditional survey method. After the study started, alumni engagement was conducted periodically with the alumni which this time included two additional batches. The engagement and follow-up with the alumni were predominantly conducted through social media (Facebook) and chatting apps (WhatsApp, Messenger, and Telegram). At the end of batch 10, a number of 50 out of the total 87 the alumni were successfully contactable by the research team. The other 37 remaining alumni remained uncontactable through both traditional and online methods at the time of the study. This marked an increase in the contactable rate of 26.1% as compared to during the start of the study, despite the increased numbers of alumni. The research team made sure consistent engagement and communication were done with those who from the batch during the study was carried out, which was batch 9 and 10. Since they have been consistently being a follow-up, it becomes significantly easier to contact and obtaining their permission to participate in the survey.

<table>
<thead>
<tr>
<th>Method use</th>
<th>Week 1</th>
<th>Week 2</th>
<th>(After Reminder) Week 4</th>
<th>Reminder improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mail survey (pilot survey), n=36</td>
<td>8/36 (22.2%)</td>
<td>15/36 (41.6%)</td>
<td>20/36 (55.6%)</td>
<td>14%</td>
</tr>
<tr>
<td>Online survey (without gamification), n=50</td>
<td>17/50 (34%)</td>
<td>20/50 (40%)</td>
<td>31/50 (62%)</td>
<td>22%</td>
</tr>
<tr>
<td>Online survey (Gamification), n=50</td>
<td>15/50 (30%)</td>
<td>24/50 (48%)</td>
<td>41/50 (82%)</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 5.4: Comparison of response rate for the different methods used

Only a total of 22% (19 out of 60) of the alumni were contactable at the beginning of the study. Gradually when the pilot study was carried out, a total of 36 alumni (52.9%) shown in table 5.4 were successfully contacted by the research team. During the pilot study, mail survey was the initial data collection method used for the impact study of the RiGHT programme, which was inefficient and received a low response. Pen and paper surveys were distributed to the alumni in the rural area and instructed to be mailed back once completed. Subsequently, online survey was used and distributed through Facebook, WhatsApp, Telegram, and SMS.

Table 5.4 shows the response rate between the studies conducted with the different data collection methods. The pilot study was carried out with mail survey which is considered as the traditional method without the use of any engagement. During the pilot study of using the mail survey, a total of 36 alumni were contactable. At the end of the study after week 4, the mail survey method managed a response rate of 55.6% with 20 responded alumni out of the total 36 alumni. This method achieved the lowest response rate in comparison with the online survey methods employed that were carried out subsequently. Later on after the
engagement strategies were implemented, the number raised to a total of 50 contactable alumni. The data collection method was also switched to online survey. The online survey was carried out for the first time of the study as a benchmark, managing a final response rate of 62% response rate. It is considered to be marginally better in comparison with the mail survey, with 31 out of the total 50 alumni participated. The third and final study was conducted with the implementation of the gamification system together with the online survey for data collection. This method was shown to be the most promising among all three of the methods conducted, achieving a final response rate of 82%, whereby 41 out of the total 50 alumni participated. Compared to the online survey without gamification which is the benchmark, the method with gamification managed an increase of 20% more participation. The study demonstrates that gamification is an effective incentive towards encouraging the participation of the online data collection process.

The response rate during the first the week of the survey was also recorded to determine how quickly they submit their survey. Mail survey for the first week achieved a response rate of 22.2%. This was expected due to the significantly longer travel time required for the survey to be mailed back to the research team. Meanwhile, the response rate for the online survey without gamification on the first week achieved a response of 34%, while the online survey with gamification received a response rate of 30%. The online surveys across the two times carried out showed a fairly consistent trend of roughly one in three alumni responding within the first 7 days. The increase in response rate in comparison to the mail survey is undoubtedly due to the instant submission online that does not require any travel time the ease of filling up the survey at their convenience is also a factor for them to fill up faster and could be done anywhere as there is internet access.

While the online survey with gamification had a marginally poorer response rate during week 1 in comparison with the online survey without gamification, it achieves the best response rate at the end of week 2 with 48%. The implementation of gamification with the online survey in this study demonstrated that despite not achieving the fastest response rate, it succeeded on motivating more alumni to participate in the data collection process over a longer period of time. It is also believed that due to gamification being a relatively new concept for the alumni, it would take a few rounds of interaction with the gamification system to become familiar with it. Since it is the first time gamification is implemented, the competitive environment among the alumni is forged after seeing their peers appearing on the scoreboard and earning points in the process of completing the survey. This is a plausible explanation to why the online survey with gamification achieved the highest response rate on week 2 and 4, despite being behind on the first week. A subsequent repeated study using online survey with gamification would most likely result in more response collected especially in the first week.
Reminders were sent to the alumni after at the start of week 3 to help remind them about the online survey. It was found to be highly successful in boosting the return rates of the online survey as shown in Table 5.4 at the end of week 4. On average, a simple reminder to the alumni and with ample time, was able to improve the average response rate of 23.3% for the different methods that were used. This indicates that reminders are very useful and can effectively be employed together with any of the other methods used. The large increase of response rate after reminders were sent out also indicates that the alumni may have genuinely missed out on the notice or message that was sent to them or forgotten after seeing it. Specifically, for the online survey conducted with gamification, reminders achieved the highest increase rate of 34%. This may be due to the unfamiliarity of using gamification together with the survey, hence it requires more time as the alumni are still getting used to it.

<table>
<thead>
<tr>
<th></th>
<th>Demographics</th>
<th>Mail Survey (n=20)</th>
<th>Online survey (Gamification) n= 41</th>
<th>P value (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batch 1-8</td>
<td>65.0%</td>
<td>13</td>
<td>39.0%</td>
<td>16</td>
</tr>
<tr>
<td>Batch 9-10</td>
<td>35.0%</td>
<td>7</td>
<td>56.1%</td>
<td>25</td>
</tr>
<tr>
<td><strong>Offer ICT services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40.0%</td>
<td>8</td>
<td>58.5%</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>60.0%</td>
<td>12</td>
<td>41.5%</td>
<td>17</td>
</tr>
<tr>
<td><strong>Income Before RiGHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Income or Below RM1000</td>
<td>90%</td>
<td>18</td>
<td>95.1%</td>
<td>39</td>
</tr>
<tr>
<td>Above RM1000</td>
<td>10%</td>
<td>2</td>
<td>4.9%</td>
<td>2</td>
</tr>
<tr>
<td><strong>Income After RiGHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Income or Below RM1000</td>
<td>45.0%</td>
<td>8</td>
<td>57.5%</td>
<td>24</td>
</tr>
<tr>
<td>Above RM1000</td>
<td>55.0%</td>
<td>11</td>
<td>40.4%</td>
<td>17</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 and below</td>
<td>50%</td>
<td>10</td>
<td>48.8%</td>
<td>20</td>
</tr>
<tr>
<td>25-44</td>
<td>50%</td>
<td>10</td>
<td>51.2%</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 5.5: Fisher’s exact test and odd ratio analysis

In Table 5.5, the Fisher's exact test was carried out through SPSS identified two factors, the alumni’s batch and their income before RiGHT, showed significant association with the data collection methods. The alumni batch achieved a value of p = 0.012, while income before RiGHT showed a value of p = 0.001. The alumni from batch 1-8 were found to favour mail survey, while those from batch 9-10 preferred to participate in the online survey. This is likely attributed to the frequent use of online survey with the alumni from batch 9-10 during their RiGHT programme, hence they are more comfortable and familiar with using
it. Meanwhile, those from batch 1 to 8 who were graduated even before the study begins, have not participated in any survey over the internet that was conducted by the research team. Through the use of odd ratio with the formula shown above, alumni from batch 1-8 were 2.9 times more likely to participate in the mail survey as compared to the online survey.

Besides, alumni who are unemployed and from the low-income group (below RM1000) before joining the RiGHT alumni, were found to be the majority. They have shown that they favour the usage of the online survey method. Based on odd ratio calculation, it is found that those in this income group are 8.7 times more likely to participate in the online survey as compared to the mail survey. It is highly likely due to the zero cost of filling it up online in comparison to the mail survey, in which mailing the forms would incur additional cost to the respondent. Those from the lower income group after graduating from RiGHT also favoured the use of online survey albeit at a lower rate, with the usage of 1.9 times more likely. Alumni who provide ICT services to the community were also found to be 2.1 times more likely to use online surveys. It is likely attributed to the familiarity of using online services among this group of alumni. They are likely the ones who are more aware of the clear benefits of the online survey method and making full use of it.

Meanwhile, the age factor of the alumni showed nearly identical usage of both mail and online survey method. Based on odd ratio calculation, those at the age of 25 and below were found to be 1.05 times more inclined towards the use of mail survey. This means that age does not have much impact towards the preference of the data collection method which was unexpected. The assumption was that those from the younger age group would prefer to participate in the online version of data collection, as they are generally more used to the usage of online services such as social media and e-payment. It is worth noting that other factors such as age, income after RiGHT and offering of ICT services does not show significant associations towards the preference of the survey methods based on the Fisher’s exact test. The findings from this study was published in the Journal of Integrated Design and Process Science [129].

5.4 Summary

The improvement in response rate through the use of gamification shown mirrors the outcome of the review of the empirical studies on gamification by Hamari, Koivisto, and Sarsa in 2014. The review of 24 empirical studies across multiple contexts such as education, healthcare, data gathering, showed that majority of the studies achieved positive effect after implementing certain forms of gamification concepts [52]. The authors stated that majority of the reviewed papers showed improvements after the implementation of the motivational affordances, which are also known as the gamification mechanics used such as points,
leaderboards, and badges. One of the papers reviewed in the field of data collection found that that gamification successfully leads to more participation in the survey [128]. The authors suggested that motivation is increased due to the use of game mechanics, leading to more participation.

The response rate of the study at 82% through the use of a gamification system with online survey, as compared to the 56% response rate for the mail survey method. It is also higher than merely the use of online survey alone which achieve a response rate of 62%. The result proves that the use of the online survey with the gamification system to be a solid alternative data collection method as compared to traditional collection method through mail. The study also confirms the hypothesis that gamification is indeed effective in boosting the response rate through intrinsic motivation as no tangible rewards were awarded, thus making it more sustainable. The implementation of engagement with the target group and also reminders are key towards the increase in response rate.

Data quality is also improved as there is no more skipped questions as participants are required to complete all the questions and in the correct sequence before submitting. Human error is also avoided as the researcher is no longer required to manually input the data collected into the computer for analysis unlike the usage of hardcopy survey for data collection. Furthermore, skip logic error which was earlier discussed is also prevented, as participants would not have access to certain sections based on their prior answers. Furthermore, the switch to online data collection, has also greatly improved the response time of the submitted questionnaire and minimized cost. The alumni are no longer needed to post the completed survey back to the research team. While difficult to be quantified, engagement through relationship building and consistent communication has undoubtedly been identified as a key component towards motivating the alumni in the participation of the survey. After the engagement done, alumni were generally more open to provide feedback and participate in the online survey as compared to the very start of the study where their cooperation was a major obstacle. This proves that the user engagement is successfully enhanced, and that a better user experience is achieved. From the study, the combination of online survey, gamification system, and engagement through social media has shown promising results as a solution towards achieving a data collection process that is sustainable and viable to be carried out consistently.

One drawback of the study is the small sample size of alumni. The result of the study carried out may differ while repeated with a larger sample size of alumni. While the total alumni trained by the end of batch 10 was at 87, it remains challenging to provide conclusive evidence that the proposed gamification system could be replicated with similar results. The other possible choice the research have done was to make contact with as many as possible with the alumni. Since the sample size is small, outlier data would have a big influence towards the overall result. Future works of repeating the study can be conducted when more
alumni have graduated. It could also solidify the findings of the study if the outcomes continue to remain similar with a larger data sample size. The total completion time and number of finished questions could not be measured as Google Forms do not measure them. It only allows the participant to submit when the survey is completely filled up correctly.
Chapter 6 - Conclusion and Recommendations

Based on the findings of the study conducted in the previous chapters, this chapter presents a conclusive overall summary towards the whole thesis in relation to the objectives that was set. This chapter also covers the limitation of the study and proposed possible future works.

6.1 Summary of conclusion

To sum up the thesis, both the two objectives set at the beginning of the study were successfully achieved. The first part of the study conducted was to improve the candidates selection process, through studying the relation between motivation factors and performance of the candidates. Through the outcome of the study, the identified motivation factors contributes towards becoming a guideline for the candidate selection process in the future. It points to the specific type of motivation and study strategy that has a large influence towards the different types of assessment. The hypothesis is that candidates that are highly motivated, especially with the necessary specific motivation factors, would perform better for the assessment. If the idea is proven successful, the motivational factor would be a good indicator and guideline for the screening process in the future for the potential candidates. In short, the aim is to successfully identify candidates who are highly motivated and willing to learn, and that they would be given priority during the selection stage.

Initially, the results of the two assessments of the candidates were examined. Assessment 1 consisted mainly of office suite software, while assessment 2 involves a wider range such as photo editing, web publishing, maintenance, and e-commerce etc. Results showed the performance of the candidates for assessment 1 were found to be generally better than the results of assessment 2. This study was conducted with the use of a modified MSLQ and SMTSL questionnaire to measure the motivation level and study strategies of the candidates. The questionnaire total score is then measured with the score of the candidate’s performance during their assessment. Spearman’s rank correlation being a non-parametric approach, was used to compare the correlation between each of the scale and the score of the two assessment. This method was used because the scores are of ordinals scales and not evenly distribute. Among the different motivational scale tested over two studies, it was found that the intrinsic goal orientation, time management and study environment scale has the most impact towards the candidate’s performance in the programme assessment. Other scales that have a moderate impact towards performance includes self-efficacy, learning value, extrinsic goal orientation, and peer learning. Meanwhile, other scales such as effort regulation and learning environment stimulation have not shown any signification influence towards either of the assessment. The study concluded that candidates that has a high intrinsic goal orientation, along with good time management
and study environment, have shown to most likely do well during their assessment. Through the findings of the study, it has met the objective of exploring the role of motivation factors towards improving the candidate selection process. Through the improved understanding towards the role of motivation in the candidate’s performance, an effective appraisal system can be developed based on the motivation scales that was impactful. Ideally, it would help select candidates with the right motivation, improve overall performance during RiGHT programme and ultimately produce well-trained alumni to be able to serve their rural community better.

The objective for the second part of the research study was to improve the data collection process through gamification and sustainable engagements methods. Primarily, this is measured through the response rate of the data collection process among the alumni. The study is conducted by implementing alumni engagement through social media, while also adopting online data collection methods with gamification. Initially, the previous follow-up process was identified to be unsustainable as it requires a large amount of resources. This means that the evaluation process regarding the impact of the RiGHT alumni towards their rural community, could not be carried out consistently. It was also largely due to the alumni either being uncontactable or limited communication. A new strategy developed based on focusing towards alumni engagement through social media and gamification, helped to improve the response rate of the online data collection. Alumni engagement was conducted regularly over social media, by engaging them through casual conversation, sharing and discussing of the latest technological news. The alumni were also encouraged to post their activities or share their achievements in the alumni group that was specifically created for engagement purpose with and among the alumni. Before implementing the engagement process at the beginning, only a total of 19 alumni out of a total of 60 trained alumni (up till batch 8) were contactable or have prior established communication at a successfully contacted rate of 31.7%. After the engagement process was conducted, the research team managed to contact a total of 50 alumni out of a total 87 alumni (up till batch 10) at a contact rate of 57.8%. This marked a huge increased in the contactable alumni for the study needed for participation in the data collection. Besides, the data collection method was also migrated to the online version from the traditional pen and paper version, which substantially lowered the cost and at the same time improve the survey form returned rate from the participants. This is attributed to the ease of filling up an online form as long the facilities and hardware are available.

At the same time, gamification was also used as both an engagement tool and also a motivation element for the data collection process. A prototype gamification framework was proposed, based on the Octalysis Gamification Framework developed by Yu-Kai Chou, which focuses on being a “Human-Focused Design”. Gamification elements such as leaderboard, points, status, badges, level progression were part of the
gamification prototype designed to motivate the participation of the alumni in the data collection process. The system not only aims to create competition among the alumni in terms of score, rank, and progression, but also to provide them with a platform to voice their opinions and feedback. It also empowers the alumni to become part of improving the programme for future candidates, while at the same time becomes a role model for future alumni through their contribution and achievement to their community. Once a survey is filled up, the alumni will be awarded a certain amount of points, thus progressing in the respective gamification feature such as their leaderboard ranking, unlocking badges and level progression.

Data collection of the three methods was carried with an interval of three months. The methods conducted were mail survey, normal length online survey, and online survey with gamification. Based on the response rate recorded, the method of using online survey with the gamification system shown to have the highest response rate at 82% (41/50). Meanwhile, the traditional mail survey was the worst among the methods, at a response rate of only 56% (20/36). This showed that the use of online survey with gamification has successfully improved the response rate by 26% as compared to the mail method conducted during the pilot survey. The study highlights the online survey and gamification method to be an ideal alternative towards traditional mail method. Reminders also played an important role in enhancing the rate of response. A reminder was given after two weeks of distributing the survey, which was found to be very successful in boosting the response rate. On average, reminders helped further boost the response rate by around 23%.

The objective for the study was met, as the strategy developed through the combination of online survey, gamification system, and engagement through social media, has shown to achieve favorable results towards a sustainable data collection process that can be conducted consistently with minimal resources.

6.2 Limitation and future works

Despite efforts to develop an ideal solution for the issues that the study aimed to solve, they are undoubtedly certain limitations towards the study conducted. This section presents the discussion regarding the identified limitations, suggestions and ideas for solving these issues are proposed for possible future works.

The main limitation of the study is regarding the small sample size, which has been a concern towards the reliability and accuracy of the result from the study. The small sample size is due to the limited fixed amount of participant each batch for the study, which is the alumni. The concern is that outliers in the data would cause a huge impact towards the data, thus affecting the final outcome. Results may also differ if the sample size of the alumni was larger than the present size. To verify the validity of the results, one possible solution is to continue repeating the study multiple times with the alumni in the future. Having already established engagement with the existing alumni, the aim is to repeat the study with the addition of a new batch of
alumni, where the growing of more graduated alumni would result in a larger sample size. Ultimately, this would help improve the quality of the result, which either further justifies the results that were obtained from the study conducted this time, or provide new insights with the solid backing of additional data.

Furthermore, the gamification system prototype in its current state is not yet being integrated together with the online survey. Since the prototype is on a website of its own, the data update still currently requires manual input by the researcher. This method requires a consistent update of the data each time an alumnus submits their survey form, making it tedious and would not be feasible for the long term. Just like the fully gamified survey done by Cechanowicz, Gutwin, Brownell, and Goodfellow, developing an integrated gamified solution that is fully integrated with the survey would be ideal [63]. The system could possibly be more effective at demonstrating the potential of using gamification in the area of data collection. Being both an engagement tool and motivational element, the use of a well-developed gamified solution might potentially be replicated for data collection in other domains if proven successful. Future work regarding the evaluation of other gamification models or framework such as 6D, GAME and SGD. It would highlight the strength and lack of the chosen Octalysis gamification framework, while explore the alternatives that could be studied upon in the future.

Moreover, the gamification solution experimented in the study thus far has mainly only been providing ‘intangible rewards’ based on the concept of intrinsic motivation. Unlike most survey whereby a certain form of tangible gift is provided such as vouchers or lucky draws, the solution focuses solely on using intrinsically based motivations through consistent engagement and gamification. This also means we are unaware regarding the impact of using tangible gifts towards the final outcome, as some alumni might react to tangible gifts differently. This could be a possible direction for the future study, whereby the use of both tangible and intangible rewards are used together and the results of the response rate could be compared to this study. Due to some of the limitations as discussed regarding the proposed solution for sustainable user engagement, it would require further fine tuning and improvement before being published as a generic model to be used by other researchers. Further study with a large group of participants would also be required, in order to determine whether the desired impact could be replicated on a larger scale. This is to ensure that the model would be effective in providing a sustainable engagement solution that could be easily adopted and replicated in other domain. Once the model is successfully fine-tuned, this innovative approach could also potentially become an intellectual property in the future.

Lastly, one possible idea for future research will be the development of a predictive weightage system, based on the identified motivation factors that correlated with the candidate’s performance. Factors that shows higher correlation will carry a higher weight in predicting the success of the candidate. The idea is
that during the selection process, a motivation survey will be conducted for the potential candidates. From the result of the survey, the predictive weightage system will generate a report predicting the possibility of them performing well in programme. The system would require further study and fine-tuning to ensure the prediction accuracy is at a high level.
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Appendices

Implied Consent for Online Survey

I volunteer to participate in a research project conducted by the research team from University of Technology Sarawak. I understand that the project is designed to gather information about the impacts of human capital development programs on socio-economic development in rural areas of Sarawak, Malaysia.

My participation in this project is voluntary. I understand that I will be one of approximately 30 people participating in this research and I will not be paid for my participation.

I understand that I have the right to decline to answer any particular questions in the questionnaire, and I may withdraw and discontinue participation at any time without penalty.

Participation involves the completion of a questionnaire which should take approximately 10-15 minutes. I understand that if I do not complete the questionnaire, I will not be able to participate in the research study.

I understand that the researcher team will not identify me by name in any academic reports or scientific papers. I understand that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals.

I understand that all personal information I provide during this research study can be accessed only by the research team, and will not be disclosed to the third party without my permission.

I understand that this research study has been reviewed and approved by Swinburne University Human Research Ethics Committee (SUHREC). For any doubts or questions regarding this research, I can contact:

The Chief Investigator: Dr. Patrick Hang Hui Then, Email: pthen@swinburne.edu.my
The Co-investigator: Dr. Lau Bee Then, Email: blau@swinburne.edu.my, and
The Co-investigator: Dr. Vong Wan Tze, Email: wyooc@swinburne.edu.my

This project has been approved by or on behalf of Swinburne's Human Research Ethics Committee (SUHREC) in line with the Australian National Statement on Ethical Conduct in Research Involving Humans. If you have any concerns or complaints about the conduct of this project, you can contact: Research Ethics Officer, Office of Research & Graduate Studies (H68), Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122. Tel (03) 9214 5218 or +61 3 9214 5218 or resehtics@swin.edu.au

* Required

1. I read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study. *

   Mark only one oval.

☐ I AGREE TO PARTICIPATE      Skip to question 2.

☐ I DECLINE      Stop filling out this form.

Socio-economic Impact Survey

This form is to be completed by individuals who have successfully completed the RIGHT program. The results provide important information for policy-makers to identify possible ways of: (1) increasing ICT access and usage, and (2) improving the socio-economic impact of the program on rural communities in Sarawak. You are strongly suggested to use a DESKTOP/LAPTOP computer to fill up this form. The survey should take approximately 10-15 minutes only to complete.

Borang ini hanya diisikan oleh individu yang telah berjaya menyelesaikan program RIGHT. Keputusan kajian ini akan diberikan kepada para pembuat dasar supaya mereka dapat mengenal pasti cara yang
mungkin untuk: (1) meningkatkan akses dan penggunaan ICT, dan (2) meningkatkan keberkesan program ini terhadap sosio-ekonomi di luar bandar Sarawak. Anda amat dicadangkan menggunakan KOMPUTER MEJA/RIBA untuk mengisi borang ini. Kajian ini perlu mengambil masa lebih kurang 10-15 minit untuk disiapkan.

Demography

Untitiled Title

2. Gender
   Jantina anda
   *Mark only one oval.*
   - Male (Lelaki)
   - Female (Perempuan)

3. Age (years)
   Umur (tahun)
   *Mark only one oval.*
   - Less than 18
   - 18 - 20
   - 21 - 25
   - 26 - 30
   - 31 - 35
   - 35 - 40
   - More than 40

4. Highest education level
   Tahap pendidikan yang tertinggi
   *Mark only one oval.*
   - UPSR
   - PMR
   - SPM
   - STPM
   - Technical School (Sekolah Teknik)
   - Diploma
   - Bachelor (Saucan muda)
   - Postgraduate (Pascasiswaza)
5. Place of birth (division, district)

Tempat lahir (bahagian, daerah)

Check all that apply.

- Betong, Betong District
- Betong, Saratok District
- Bintulu, Bintulu District
- Bintulu, Tatau District
- Kapit, Belaga District
- Kapit, Kapit District
- Kapit, Song District
- Kuching, Bau District
- Kuching, Kuching District
- Kuching, Lundu District
- Limbang, Limbang District
- Limbang, Lawas District
- Mukah, Dalat District
- Mukah, Daro District
- Mukah, Matu District
- Mukah, Mukah District
- Samarahan, Asajaya District
- Samarahan, Samarahan District
- Samarahan, Serian District
- Samarahan, Simunjan District
- Sarakei, Julau District
- Sarakei, Maradona District
- Sarakei, Pakan District
- Sarakei, Sarakei District
- Sibu, Kanowit District
- Sibu, Selaranau District
- Sibu, Sibu District
- Sri Aman, Lubok Antu District
- Sri Aman, Sri Aman District
- Other: ____________________________

6. Name of village

Nama kampung

______________________________
7. Number of household members
   Bilangan ahli keluarga
   *Mark only one oval.*
   
   ○ 1 - 5
   ○ 6 - 10
   ○ 11 - 15
   ○ 16 - 20
   ○ More than 20

8. Are there any children aged < 15 years in your household?
   Adakah keluarga anda mempunyai kanak-kanak yang berumur < 15 tahun?
   *Mark only one oval.*
   
   ○ Yes
   ○ No

**ICT Access**

9. Does your household has a computer (desktop, laptop or tablet)?
   Adakah keluarga anda mempunyai komputer (komputer meja, komputer riba atau tablet)?
   *Mark only one oval.*
   
   ○ Yes
   ○ No

10. What type(s) of computers are used by your household?
    Apakah jenis komputer yang digunakan oleh keluarga anda?
    *Check all that apply.*
    
    ○ Desktop (Komputer meja)
    ○ Laptop (Komputer riba)
    ○ Tablet (Komputer Tablet)
    ○ No computer (Tidak komputer)

11. Does your household has a fixed telephone line?
    Adakah keluarga anda mempunyai talian telefon tetap?

    *Mark only one oval.*
    
    ○ Yes
    ○ No
12. Does your household have a mobile phone?
   Adakah keluarga anda mempunyai telefon bimbit?
   Mark only one oval.
   ☐ Yes
   ☐ No

13. How often do you typically use the Internet during the last three months from any location?
   Berapa kerapkah anda biasanya menggunakan Internet dalam tempoh tiga bulan yang lalu dari mana-mana lokasi?
   Mark only one oval.
   ☐ Everyday (Setiap hari)
   ☐ A few times a week (Beberapa kali seminggu)
   ☐ A few times a month (Beberapa kali sebulan)
   ☐ Never use the Internet (Tidak pernah menggunakan Internet)

14. Where did you use the Internet in the last three months?
   Di manakah anda menggunakan Internet dalam tempoh tiga bulan yang lalu?
   Check all that apply.
   ☐ Home (Rumah)
   ☐ Place of work (Tempat kerja)
   ☐ Place of education (Tempat pendidikan)
   ☐ Another person’s home (Rumah orang lain)
   ☐ Community Internet access facility (Perpustakaan awam, pusat komuniti digital etc.)
   ☐ Commercial Internet access facility (Kafe siber, hotel, lapangan terbang etc.)
   ☐ Use of the Internet when mobile via a mobile phone, laptop or tablet (Menggunakan Internet apabila mudah alih melalui telefon bimbit, komputer riba atau tablet)

15. Do you have internet access at home?
   Adakah anda mempunyai akses Internet di rumah?
   Mark only one oval.
   ☐ No internet connection
   ☐ Yes, mobile broadband (Celcom, DiGi, Maxis etc.)  Skip to question 17.
   ☐ Yes, DSL (TM Streamyx, TM UniFi etc.)  Skip to question 17.
ICT Access

16. Why does your household not have Internet access?
Kenapakah keluarga anda tidak mempunyai akses Internet di rumah?
Check all that apply.

☐ Do not need the internet (Tidak perlu Internet)
☐ Have access to the Internet elsewhere (Mempunyai akses Internet di tempat lain)
☐ Lack of confidence, knowledge or skills to use the Internet (Kurang keyakinan, pengetahuan atau kemahiran untuk menggunakan Internet)
☐ Cost of the equipment is too high (Kos peralatan terlalu tinggi)
☐ Cost of the service is too high (Kos perkhidmatan terlalu tinggi)
☐ Internet service is not available in the area (Perkhidmatan Internet tidak terdapat di kawasan itu)
☐ Internet service is available but of poor quality (Perkhidmatan Internet boleh didapati tetapi tidak berkualiti)
☐ Other: ____________________________

Employment Status

17. What was your employment status before joining the program?
Apakah status pekerjaan anda sebelum menyertai program ini?
Mark only one oval.

☐ Employee / Full-time (Perkerja / Sepenuh masa)
☐ Employee / Part-time (Perkerja / Sambilan)
☐ Self-employed / Full-time (Bekerja sendiri / Sepenuh masa)
☐ Self-employed / Part-time (Bekerja sendiri / Sambilan)
☐ Unemployed / School leaver (Tidak bekerja / Lepasan sekolah)
☐ Unemployed / Looking for work (Tidak bekerja / Sedang mencari kerja)
☐ Unemployed / Not looking for work (Tidak bekerja / Tidak mencari kerja)
☐ Student (Pelajar)
☐ Retired (Pesara)
☐ Housewife (Suri rumah)
18. What was your monthly income before joining the program?
Berapakah pendapatan bulanan anda sebelum menyertai program ini?
Mark only one oval.

- No income
- Less than RM 500
- RM 500 - RM 1000
- RM 1001 - RM 1500
- RM 1501 - RM 2000
- RM 2001 - RM 2500
- RM 2501 - RM 3000
- RM 3001 - RM 3500
- RM 3501 - RM 4000
- Greater than RM 4000

19. What is your current employment status?
Apakah status pekerjaan semasa anda?
Mark only one oval.

- Employee / Full-time (Perkerja / Sepenuh masa)
- Employee / Part-time (Perkerja / Sambilan)
- Self-employed / Full-time (Bekerja sendiri / Sepenuh masa)
- Self-employed / Part-time (Bekerja sendiri / Sambilan)
- Unemployed / School leaver (Tidak bekerja / Lepasan sekolah)
- Unemployed / Looking for work (Tidak bekerja / Sedang mencari kerja)
- Unemployed / Not looking for work (Tidak bekerja / Tidak mencari kerja)
- Student (Pelajar)
- Retired (Pesara)
- Housewife (Suri rumah)

20. What is your current monthly income?
Berapakah pendapatan semasa anda setiap bulan?
Mark only one oval.

- No income  Skip to question 25.
- Less than RM 500
- RM 500 - RM 1000
- RM 1001 - RM 1500
- RM 1501 - RM 2000
- RM 2001 - RM 2500
- RM 2501 - RM 3000
- RM 3001 - RM 3500
- RM 3501 - RM 4000
- Greater than RM 4000
Employment Status

21. In what type of business, industry or profession do you currently work?
   Dalam apa jenis perniagaan, industri atau profesi yang anda kini bekerja?
   Mark only one oval.
   - Construction (Pembinaan)
   - Communications (Komunikasi)
   - Education (Pendidikan)
   - Finance, Insurance, Real Estate (Kewangan, Insurans, Hartanah)
   - Government (Kerajaan)
   - Health Care (Pendjagaan Kesihatan)
   - Manufacturing (Pembuatan Produk)
   - Retail, Wholesale (Runcit, Borong)
   - Services (Perkhidmatan)
   - Software, Technology, Internet (Perisian, Teknologi, Internet)
   - Transportation (Pengangkutan)
   - Others (Lain-lain)

22. What is your current job position?
   Apakah kedudukan pekerjaan anda sekarang?
   Mark only one oval.
   - Clerical (Kerani)
   - Company Officer (Pegawai Syarikat)
   - Salesperson (Jurujual)
   - Supervisor (Penyelia)
   - Scientist/Engineer
   - Technical Specialist (Fakar teknikal)
   - Owner/Partner (Pemilik/Rakan Kongsi)
   - Department Head (Ketua Jabatan)
   - Director (Pengarah)
   - President/CEO (Presiden/Ketua Pegawai Eksekutif)
   - Chairman of the Board (Pengerusi Lembaga Pengarah)
   - Others (Lain-lain)

23. Did you apply the knowledge and skills you gained from the program to your work?
   Adakah anda menggunakan pengelahan dan kemahiran yang anda perolehi daripada program ini dalam pekerjaan?
   Mark only one oval.
   - Yes
   - No
Indicate your level of agreement about the following statements:

Nyatakan tahap persetujuan anda mengenai kenyataan berikut:

24. Using the knowledge and skills I gained from the program,
   Dengan pengetahuan dan kemahiran yang saya peroleh dari pada program ini,
   *Mark only one oval per row.*

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have made extra income. (Saya telah mendapat pendapatan tambahan.)</td>
<td></td>
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</tr>
<tr>
<td>I have gotten a better job. (Saya telah mendapat kerja yang lebih baik.)</td>
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</tr>
<tr>
<td>I have increased my confidence while performing work. (Saya telah meningkat keyakinan saya semasa bekerja)</td>
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</tr>
<tr>
<td>I have been promoted at work. (Saya telah dinaikkan pangkat di tempat kerja.)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

ICT Centre

25. Do you have an ICT centre (currently or in the past)?
   Adakah anda mempunyai pusat ICT (pada semasa atau pada masa yang lalu)?
   *Mark only one oval.*

<table>
<thead>
<tr>
<th>No ICT centre (Tiada pusat ICT)</th>
<th>Yes / In active operation (Beroperasi dengan aktif)</th>
<th>Yes / Opening soon (Akan dibuka)</th>
<th>Yes / Inactive for a period of 3 months (Tidak aktif selama 3 bulan)</th>
<th>Yes / Inactive for a period of 6 months (Tidak aktif selama 6 bulan)</th>
<th>Yes / Inactive for more than 6 months (Tidak aktif melebihi 6 bulan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skip to question 37.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
ICT Centre

26. Location of ICT centre
Lokasi pusat ICT

Check all that apply.

- Belong, Belong District
- Betong, Saratok District
- Bintulu, Bintulu District
- Bintulu, Tatau District
- Kapit, Belaga District
- Kapit, Kapit District
- Kapit, Sung District
- Kuching, Bau District
- Kuching, Kuching District
- Kuching, Lundu District
- Limbang, Limbang District
- Limbang, Lawas District
- Mukah, Dalat District
- Mukah, Daro District
- Mukah, Matu District
- Mukah, Mukah District
- Samarahan, Asajaya District
- Samarahan, Samarahan District
- Samarahan, Serian District
- Samarahan, Simunjan District
- Sarakei, Julau District
- Sarakei, Maradong District
- Sarakei, Pakan District
- Sarakei, Sarakei District
- Sibu, Kanowit District
- Sibu, Selangau District
- Sibu, Sibu District
- Sri Aman, Lubok Antu District
- Sri Aman, Sri Aman District
- Other:
27. "Year" you started (or going to start) the ICT centre
   "Tahun" anda bermula (atau akan memulakan) pusat ICT itu
   Mark only one oval.
   ☐ 2006
   ☐ 2007
   ☐ 2008
   ☐ 2009
   ☐ 2010
   ☐ 2011
   ☐ 2012
   ☐ 2013
   ☐ 2014
   ☐ 2015
   ☐ 2016

28. "Month" you started (or going to start) the ICT centre
   "Bulan" anda bermula (atau akan memulakan) pusat ICT itu
   Mark only one oval.
   ☐ January
   ☐ February
   ☐ March
   ☐ April
   ☐ May
   ☐ June
   ☐ July
   ☐ August
   ☐ September
   ☐ October
   ☐ November
   ☐ December

29. What are the courses offered by your ICT centre (currently or in the past)?
   Apakah kursus-kursus yang ditawarkan oleh pusat ICT anda (pada masa ini atau pada masa yang
   lalu)?
   Check all that apply.
   ☐ No ICT Course (Tiada kursus-kursus ICT)
   ☐ Basic Computer Skills (Kemahiran Asas Komputer)
   ☐ Graphic Design (Reka Bentuk Grafik)
   ☐ Microsoft Office and OpenOffice
   ☐ Social Networking (Rangkaian Sosial)
   ☐ Web Development (Pembangunan Web)
   ☐ Other: ________________________________
30. How many people in your community have completed the ICT course(s) offered? (Regardless of whether the ICT centre is in active or inactive state)
Bberapa orang dalam komuniti anda yang telah menamatkan kursus-kursus yang ditawarkan? (Tidak kira sama ada pusat ICT itu dalam keadaan aktif atau tidak aktif)
Mark only one oval.

☐ No ICT course (Tiada kursus kursus ICT)
☐ Less than 20
☐ 21 - 40
☐ 41 - 60
☐ 61 - 80
☐ 81 - 100
☐ 101 - 120
☐ 121 - 140
☐ 141 - 160
☐ 161 - 180
☐ 161 - 200
☐ 201 - 220
☐ 221 - 240
☐ 241 - 260
☐ 261 - 280
☐ 281 - 300
☐ 301 - 320
☐ 321 - 340
☐ 341 - 360
☐ 361 - 380
☐ 381 - 400
☐ More than 400

31. What are the challenges of opening/running an ICT centre in your community?
Apakah cabaran-cabar dia untuk membuka/menjalankan pusat ICT dalam komuniti anda?
Check all that apply.

☐ No challenges (Tiada cabaran)
☐ Better Job Opportunity in Urban Areas (Peluang pekerjaan yang lebih baik di kawasan bandar)
☐ Lack of Financial Support (Kekurangan sokongan kewangan)
☐ Low Number of Customers (Kekurangan pelanggan)
☐ Unsustainable Income (Pendapatan yang tidak mampun)
☐ Other: ____________________________
32. Do you work (going to work) full-time/part-time for the ICT centre?
   Adakah anda bekerja (akan bekerja) sepenuh masa/sambilan untuk pusat ICT itu?
   Mark only one oval.
   ☐ Full-time (Sepenuh masa)
   ☐ Part-time (Kerja sambilan)

33. Do you have other part-time jobs?
   Adakah anda mempunyai kerja sambilan yang lain?
   Mark only one oval.
   ☐ Yes
   ☐ No  Skip to question 37.

Part-Time Jobs

34. What is your part-time job? Please describe.
   Apakah kerja sambilan anda? Sila terangkan.
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

35. Does the part-time job require any ICT knowledge and skills?
   Adakah kerja sambilan itu memerlukan pengetahuan dan kemahiran ICT?
   Mark only one oval.
   ☐ Yes
   ☐ No

36. Do you apply ICT knowledge and skills you gained from the program to your part-time job(s)?
   Adakan anda menggunakan pengetahuan dan kemahiran ICT yang anda peroleh daripada program ini untuk kerja sambilan itu?
   Mark only one oval.
   ☐ Yes
   ☐ No
ICT Service

37. What are the ICT services, either for a fee or free of charge, that you provide to your community after joining the programme? (Regardless of whether you have or do not have an ICT centre)

Apakah perkhidmatan ICT, sama ada dengan bayaran atau percuma, yang anda berikan kepada komuniti anda selepas menyertai program ini? (Tidak kira sama ada anda mempunyai atau tidak mempunyai pusat ICT)

Check all that apply.

☐ Never provide ICT services (Tiada memberikan perkhidmatan ICT)
☐ Bill Payments (Pembayaran Bill)
☐ Data Recovery (Pemulihan Data)
☐ Design Service (Perkhidmatan Reka Bentuk)
☐ Dropship Service (Perkhidmatan Dropship)
☐ Hardware Repair (Pembesikan Komputer)
☐ ICT Advice (Nasihat ICT)
☐ Rent PC (Sewa PC)
☐ Software Installation (Pemasangan Perisian)
☐ Printing Service (Perkhidmatan Pencetakan)
☐ Purchase air ticket (Membeli Tiket Penerbangan)

☐ Other: ____________________________________________
38. How many people in your community have received the services above from you in the past 12 months?
Berpaka orang dalam komuniti anda yang telah menerima perkhidmatan di atas daripada anda dalam tempoh 12 bulan yang lalu?
Mark only one oval.

- Never provide ICT services (Tiada memberikan perkhidmatan ICT)
- Less than 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160
- 161 - 180
- 181 - 200
- 201 - 220
- 221 - 240
- 241 - 260
- 261 - 280
- 281 - 300
- 301 - 320
- 321 - 340
- 341 - 360
- 361 - 380
- 381 - 400
- More than 400

39. In your opinion, what are the ICT implementations that your community really need now?
Pada pendapat anda, apakah pelaksanaan ICT yang paling diperlukan oleh komuniti anda sekarang?
Check all that apply.

- Cybercafe (Kafe Sibera)
- Healthcare through ICT (Penjagaan kesihatan melalui ICT)
- ICT advice and consultation (Nasihat dan penjelasan ICT)
- ICT centre (Pusat ICT)
- High quality Internet connection (Sambungan Internet yang berkualiti tinggi)
- Other: ___________________________________________
40. From a scale of 1-4, how much has the program increased your knowledge and skills about ICT?
Dari skala 1-4, apakah tahap pengetahuan dan kemahiran mengenai ICT yang telah anda perolehi melalui program ini?
*Mark only one oval per row.*

<table>
<thead>
<tr>
<th>Significantly improved</th>
<th>Moderately improved</th>
<th>Slightly improved</th>
<th>No change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT Skills</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ICT Usage**

41. Have you used a mobile phone from any location in the last three months?
Adakah anda menggunakan telefon bimbit dari mana-man lokasi dalam tempoh tiga bulan yang lalu?
*Mark only one oval.*

- Yes
- No

42. Have you used a computer (desktop, laptop, tablet) from any location in the last three months?
Adakah anda menggunakan komputer (komputer meja, komputer riba atau tablet) dari mana-man lokasi dalam tempoh tiga bulan yang lalu?
*Mark only one oval.*

- Yes
- No

43. Have you used the Internet from any location in the last three months?
Adakah anda menggunakan Internet dari mana-man lokasi dalam tempoh tiga bulan yang lalu?
*Mark only one oval.*

- Yes
- No
44. Which of the following computer-related activities have you carried out in the last 6 months?

Tandakan activiti-activiti komputer yang telah anda lakukan dalam tempoh 6 bulan yang lalu?

Check all that apply.

☐ Connecting and installing new devices e.g. a modem and printer (Menyambung dan memasang peranti baru seperti modem dan pencetak)

☐ Copying or moving a file or folder (Menyalin atau memindah fail atau folder)

☐ Creating text, images and charts with presentation software (Membuat teks, imej dan carta dengan perisian persembahan)

☐ Finding, download, installing and configuring software (Mencari, memuat turun, memasang dan mengkongfigurasi perisian)

☐ Sending emails with attached documents or pictures (Mengirim e-mel dengan fail yang dilampirkan)

☐ Transferring files between a computer and other devices (Memindahkan fail antara komputer dan peranti lain)

☐ Typing and printing documents (Menaip dan mencetak dokumen)

☐ Using basic arithmetic formulas in a spreadsheet (Menggunakan formula aritmetik asas dalam spreadsheet)

☐ Using “copy and paste” tools to duplicate or move information within a document (Menggunakan alat “copy and paste” untuk membuat salinan atau memindah maklumat dalam dokumen)

☐ Other: ____________________________
45. Which of the following Internet-related activities have you carried out in the last 6 months?

Tandakan activiti-activiti Internet yang telah anda lakukan dalam tempoh 6 bulan yang lepas?

Check all that apply.

☐ Getting information about goods or services (Mendapatkan maklumat tentang barangan atau perkhidmatan)

☐ Purchasing or ordering goods or services (Pembelian dan pesanan barangan atau perkhidmatan)

☐ Selling good or services via eBay, Lazada etc. (Menjual barangan atau perkhidmatan melalui eBay, Lazada dan lain-lain)

☐ Getting information from general government organizations (Mendapatkan maklumat dari organisasi kerajaan)

☐ Seeking health information (Mencari maklumat kesihatan)

☐ Consulting Wikipedias or other websites for learning purposes (Merujuk Wikipedia atau web lain untuk tujuan pembelajaran)

☐ Telephoning over the Internet using Skype, WhatsApp etc. (Menelefon melalui Internet menggunakan Skype, WhatsApp dan lain-lain)

☐ Participating in social networks such as Facebook, Twitter etc. (Mengambil bahagian dalam rangkaian sosial seperti Facebook, Twitter dan lain-lain)

☐ Reading blogs, online newspapers or magazines and electronic books (Membaca atau memuat turun akbar dalam talian atau majalah, buku elektronik)

☐ Watching web television, either paid or free of charge (Menonton televisyen web, sama ada secara berbayar atau percuma)

☐ Booking and buying air tickets and hotels (Membuat tempahan dan pembelian tiket penerbangan dan hotel)

☐ Sending or receiving e-mails (Menghantar atau menerima e-mail)

☐ Playing or downloading online games (Memain atau menuat turn permainan online)

☐ Streaming or downloading image, videos or music (Streaming atau memuat turun imej, video atau muzik)

☐ Looking for a job or sending/submitting a job application (Mencari pekerjaan atau menghantar / menghantar permohonan pekerjaan)

☐ Participating in professional networks such as LinkedIn and Xing (Mengambil bahagian dalam rangkaian profesional seperti LinkedIn dan Xing)

☐ Managing personal homepage (Menguruskan laman web sendiri)

☐ Maintaining or adding contents to a blog (Mengekalkan atau menambah kandungan untuk blog)

☐ Using storage space on the Internet to save documents, pictures or images such as Google Drive, Dropbox etc. (Menggunakan ruang simpanan di Internet untuk menyimpan dokumen, gambar atau imej seperti Google Drive, Dropbox dan lain-lain)

☐ Using software run over the Internet for editing text documents, spreadsheets or presentations (Menggunakan perisian jmelalui Internet untuk mengedit teks dokumen, hamparan dan persembahan

☐ Other: ____________________________________________
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List of publication

Publications that were done based on the study carried out are:
