

**INTERNATIONAL BACCALAUREATE**

**DIPLOMA PROGRAMME**

**EXTENDED ESSAY**

**Subject**

*Information Technology in a Global Society (ITGS)*

**Title**

*An examination of the extent to which the use of mobile location services in education violates the individual rights to privacy among university students in Selangor, Malaysia*

**Research Question**

*To what extent does the use of mobile location services among university students in Selangor, Malaysia, violate their individual rights to privacy?*

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**Personal Code**

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## 1.0 | Introduction

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"... If individuals are aware that they are being tracked they want to ensure the data is collected legally and never stored beyond its intended use,"

- *Estella Cohen, Senior Privacy Consultant at TrustArc.<sup>1</sup>*

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This quote manifests one's realization of their individual rights to privacy when they decided to give out their location data to the software developer. The modernization of mobile devices has revolutionized the way how personal data is collected and mined.<sup>2</sup> Recently, the Supreme Court of the United States issued a verdict in the case of *Carpenter vs. the United States*.<sup>3</sup> It was decided that the police require warrants to gather phone location data as trial evidence because previously, police collected Carpenter's digital footprints for four months without a warrant. However, it was decided that the Fourth Amendment of the United States Constitution does not protect location data.<sup>4</sup> This ruling has truly developed my fascination with the nature of this extended essay.

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<sup>1</sup> Algerim Berzinya, "Privacy Experts Weigh in on the Risks in Location Data | Turtler," Tutler.com, accessed January 11, 2020, <https://turtler.io/news/privacy-experts-weigh-in-on-the-risks-in-location-data>.

<sup>2</sup> Urvish Macwan, "Mobile Technology, Its Importance, Present And Future Trends," Finextra website, accessed January 29, 2021, <https://www.finextra.com/blogposting/14000/mobile-technology-its-importance-present-and-future-trends>.

<sup>3</sup> *Carpenter v. United States*, Supreme Court of the United States 119 (2018).

<sup>4</sup> "Supreme Court Says Warrant Necessary for Phone Location Data in Win for Privacy - CNET," accessed January 28, 2021, <https://www.cnet.com/news/supreme-court-says-warrant-necessary-for-phone-location-data/>.

Since the court ruling, the amount of surveillance has been conducted more extensively than ever before. Governments and authorities have even decided to access one's personal data, particularly their location data. This happens, unfortunately, without the absolute and clear permission from the individual. The question that I have raised when analysing this article<sup>5</sup> and its issue was the involvement of other parties concerning the unauthorized use of one's personal location data.

Hence, in this extended essay, I will address the extent of the privacy rights violation among university students in the state of Selangor, Malaysia using mobile location services on the area of impact of education with my research question, '**To what extent does the use of mobile location services among university students in Selangor, Malaysia, violate their individual rights to privacy?**'. This topic is substantial as intrusions of phone location data via mobile location services are up-to-the-minute, especially in this era of the ongoing process of e-learning. It is important to seek solutions from this new issue that has emerged in the world of information technology. It is expected that university students in Selangor would realize about the presence of certain parties that can access their location easily, which will affect their individual rights to privacy.

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<sup>5</sup> "Summary: The Supreme Court Rules in Carpenter v. United States - Lawfare," accessed January 30, 2021, <https://www.lawfareblog.com/summary-supreme-court-rules-carpenter-v-united-states>.

## 2.0 | Methodology

This investigation is carried out with the usefulness of primary sources which are conducting a questionnaire about the students' understanding and awareness towards the use of mobile location services (MLS), especially location-based mobile applications. The survey is done online through Google Forms. The survey is created in two languages, which are in Bahasa Melayu and English. It is done to ease the participants' understanding towards the questions that are given in the survey.

Interview sessions are also acquired for qualitative research on this extended essay to analyse personal responses on those that has been affected by the MLS system. The targeted participants in this interview sessions are students from universities in Selangor, Malaysia such as the National University of Malaysia and University Putra Malaysia. I have interviewed students from different universities to find dissimilarity of their personal responses regarding the questions given throughout the interview session.

I have attained information from secondary sources from newspaper articles and journals. The information that I have obtained is used to provide more insights about the related issues that I will discuss in the Extended Essay.

### 3.0 | IT Background of Mobile Location Services

Mobile location service (MLS) is the value of service that been added to provide location services (LCS), the necessary methods to track down the intended location.<sup>6</sup> MLS provides a mobile device's location information to an internet provider of a third party to give out the necessary values to the end-user. Location services also acknowledge the result of location data. If the method of positioning delivers a spatial location, it will be mapped to a more definitive location for the MLS user to understand the interpretation of the positioning method. In this subject, the position has appeared in the form of spatial coordinates or as a single point in the Cartesian coordinates.<sup>7</sup> MLS operate by utilizing both the hardware in the user's phone and information about the internet. The mainstay of MLS is the Global Positioning Service. A GPS chip is assembled in many smartphones.<sup>8</sup>

#### 3.1 | MLS: Global Positioning System

The Global Positioning System (GPS) is a satellite system for global navigation. It uses at least 24 satellites, a receiver and there is a lot of algorithms used in the system. By providing this information, air, sea and land travel is provided with location, velocity and time synchronization. It consists of six earth-centred orbital planes, each with four satellites. GPS always works and in almost all-weather conditions.<sup>9</sup>

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<sup>6</sup> Shu Wang, Jungwon Min, and Byung Yi, *Location Based Services for Mobiles :Technologies and Standards, Proceedings of IEEE ICC 2008, (Beijing, China)*, 2008.

<sup>7</sup> Ibid.

<sup>8</sup> Sam Castello, "How to Turn on Location Services on Your iPhone or Android," Lifewire.com, accessed April 21, 2020, <https://www.lifewire.com/turn-on-mobile-location-services-4156232>.

<sup>9</sup> John Kyes, "What Is GPS? | Geotab," Geotab.com, accessed February 3, 2020, <https://www.geotab.com/blog/what-is-gps/>.

### 3.2 | Bluetooth Low Energy Beacon Technology for Higher Education Use

Numerous universities use Bluetooth Low Energy Beacon Technology in their virtual learning environments. Bluetooth beacons become one-way transmitter devices (see Figure 1) to any mobile devices, which require a specific mobile application software provided by the university for academic purposes.<sup>10</sup>



*Figure 1: Bluetooth Low Energy Beacons<sup>11</sup>*

Bluetooth signals can be transmitted from the beacons containing specific bytes of information in their setting along with their universally unique identifier. Adjacent electronic Bluetooth-enabled devices could use the information to determine the location of the user and, if necessary, activate a location-based response, such as a notification. Based on the obtained signal power, mobile devices will then calculate the distances between the beacons and the system itself, with a better signal suggesting a longer distance.<sup>12</sup>

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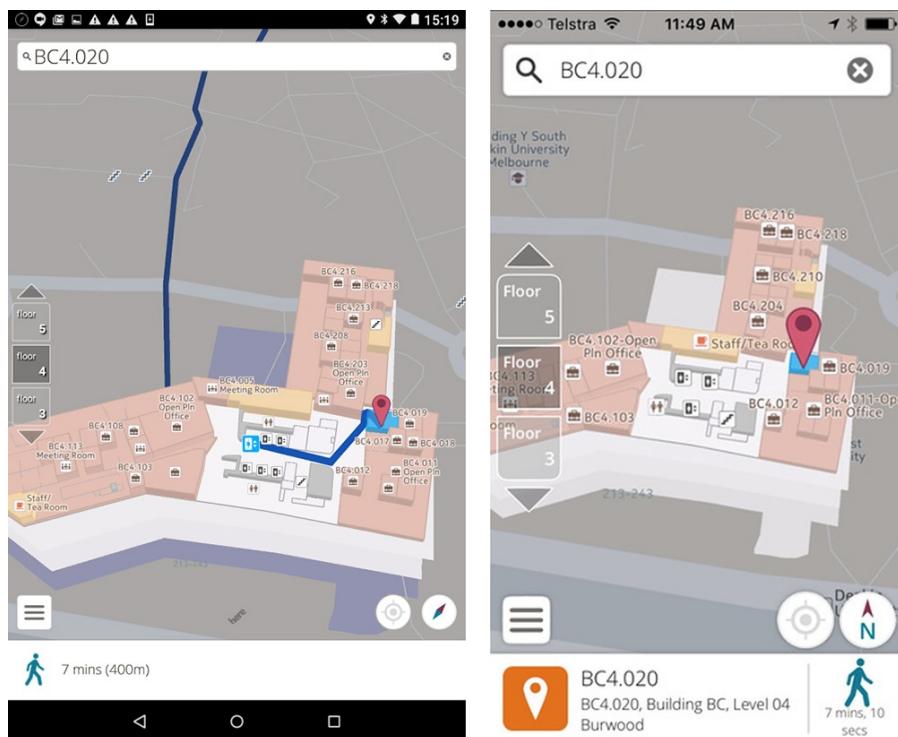
<sup>10</sup> Sion Griffiths et al., “Exploring Bluetooth Beacon Use Cases in Teaching and Learning: Increasing the Sustainability of Physical Learning Spaces,” *Sustainability (Switzerland)* 11, no. 15 (2019), <https://doi.org/10.3390/su11154005>.

<sup>11</sup> “Confidex 3002063 Viking Bluetooth Low Energy (BLE) Beacon,” accessed January 28, 2021, <https://www.ptsmobile.com/3002063.html>.

<sup>12</sup> Griffiths et al., “Exploring Bluetooth Beacon Use Cases in Teaching and Learning: Increasing the Sustainability of Physical Learning Spaces.”

### 3.3 | The Uses of MLS in Education

According to Reimer<sup>13</sup>, MLS is used to navigate students to their classes and lecturing halls. MLS application software such as HERE's Venues, provides a detailed map, which connects all buildings and walkway on campus. This app also provides wayfinding maps to help students to locate every room on campus (see Figure 2).



*Figure 2*

*Figure 2: Screenshot of Wayfinding Maps in Schools<sup>14</sup>*

When a student walks into the front entrance, a Bluetooth Low Energy beacon (BLE) signals the student's smartphone app they are installing (as part of the orientation package).

<sup>13</sup> Jasmine Reimer, "Five Benefits of Using Location Services in Universities," <http://360.here.com>, accessed January 28, 2021, <https://360.here.com/finding-b101.23a-the-benefits-of-having-location-services-in-universities>.

<sup>14</sup> Jamie Stevenson, "An App to Help Stressed Students Find Their Way across Campus," accessed January 30, 2021, <https://360.here.com/2016/04/11/campus-compass-to-help-stressed-students-find-their-way-across-campus/>.

The school is informed by this contact that the student has arrived. The student is directed to their classroom easily.<sup>15</sup>

Also, according to O'Brien<sup>16</sup>, campus management can be provided with information of location data from students with MLS. They were informed about the possibility of busy places, the crowd patterns of student at hotspot places such as bars and restaurants, libraries, and bus stations on campus. It is projected according to time. MLS enables alerts to students with the app if there is potential overcrowding.<sup>17</sup>

According to Ruckus Wireless<sup>18</sup>, students can detect lost smartphones on campus with the use of BLE Beacon Technology and Wi-Fi location analytics. An alarm would be triggered if these devices has crossed the defined geo-fences. MLS apps also provide accurate locations of where students and teachers if there are extraordinary events such as security threats and natural disaster. BLE Beacon and Wi-Fi location analytics helps student to receive necessary academic notes and content when entering the classroom by proximity analytics. BLE technology smartphone applications provide students with tailored discounts and ads for offers at local stores and restaurants.<sup>19</sup>

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<sup>15</sup> Reimer, "Five Benefits of Using Location Services in Universities."

<sup>16</sup> Brendan O'Brien, "Location-Based Services in Education – Enhanced Experiences on Campus," Cisco Blogs, accessed January 28, 2021, <https://cscoblogs-prod-17bj.appspot.com/networking/location-based-services-in-education-enhanced-experiences-on-campus>.

<sup>17</sup> Ibid.

<sup>18</sup> "Transform Education with Location Based Services," [www.ruckuswireless.com](http://www.ruckuswireless.com), accessed January 28, 2021, <https://pt.commscope.com/globalassets/digizuite/61584-brochure-education-location.pdf>.

<sup>19</sup> Ibid.

## 4.0 | Issues

### 4.1 | Threatens the Privacy of Students



*Figure 3: Respondents' agreement that location data is personal or sensitive to unauthorized users.<sup>20</sup>*

Article 12 of the United Nations Universal Declaration of Human Rights stated that “every human has the absolute individual privacy rights”.<sup>21</sup> Location data is considered as sensitive data and important information such as health conditions, affiliations, and habits may be revealed by being able to connect the name of a person with a place at a given time.<sup>22</sup> In addition, my survey suggested that 96% of university students (see Figure 3) have considered their location data as sensitive.<sup>23</sup> In this case, mobile applications that have MLS require the

<sup>20</sup> Muhammad Hilmie Jalang Ahmad Khalil Lajan, “Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services,” 2020.

<sup>21</sup> United Nations General Assembly, “Universal Declaration of Human Rights Preamble,” United Nations Declaration of Human Rights, accessed April 21, 2020, [https://www.ohchr.org/EN/UDHR/Documents/UDHR\\_Translations/eng.pdf%0Ahttp://www.un.org/en/universal-declaration-human-rights/](https://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf%0Ahttp://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf%0Ahttp://www.un.org/en/universal-declaration-human-rights/).

<sup>22</sup> Carmen Ruiz Vicente et al., “Location Related Privacy in Geo-Social Networks,” *IEEE Internet Computing* 15, no. 3 (May 2011): 20–27, <https://doi.org/10.1109/MIC.2011.29>.

<sup>23</sup> Ahmad Khalil Lajan, “Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services.”

user to grant access to their personal information, especially their location data at that moment. This implies that MLS have created new chances for location information to be exposed to irrelevant parties.<sup>24</sup> Taylor et al.<sup>25</sup> supports this as 22% of Android apps have exposed user's location data with accuracy without clear permission. Bowen and Martin<sup>26</sup> argued that users cannot control any input and output from MLS; therefore, the privacy rights of university students will always remain at risk. This is because the location of the user can be seen from both individual location predictions and network data correlated with the internet traffic of the user.<sup>27</sup> Also, this would result in educational app developers sending location information to other parties without consent, selling them to business analytical firms and proceed to use location data for personalization in advertising campaigns.<sup>28</sup>

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<sup>24</sup> “Shaw Academy Reports Online Learning ‘New Normal’ Post-Lockdown,” accessed January 29, 2021, <https://www.prnewswire.com/news-releases/shaw-academy-reports-online-learning-new-normal-post-lockdown-301085099.html>.

<sup>25</sup> Vincent F. Taylor, Alastair R. Beresford, and Ivan Martinovic, “There Are Many Apps for That: Quantifying the Availability of Privacy-Preserving Apps,” *Proceedings of the 10th ACM Conference on Security and Privacy in Wireless and Mobile Networks, WiSec 2017*, 2017, 247–52, <https://doi.org/10.1145/3098243.3098266>.

<sup>26</sup> Calvert L. Bowen and Thomas L. Martin, “A Survey of Location Privacy and an Approach for Solitary Users,” *Proceedings of the Annual Hawaii International Conference on System Sciences*, 2007, 1–10, <https://doi.org/10.1109/HICSS.2007.38>.

<sup>27</sup> Ibid.

<sup>28</sup> “Location Data and The Growing Role in Marketing and Advertising Campaigns,” accessed February 14, 2021, <https://martechseries.com/analytics/audience-data/location-data-growing-role-marketing-advertising-campaigns/>.

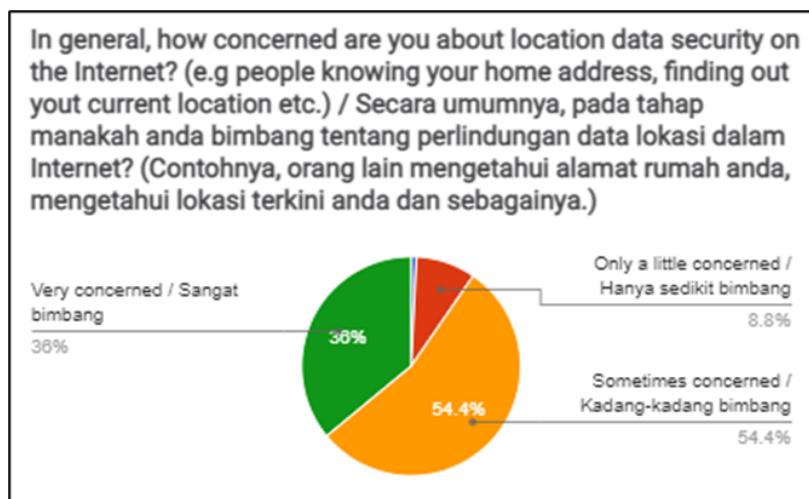


Figure 4: How concerned are respondents about location data security on the Internet?<sup>29</sup>

Schmandt and Ackerman<sup>30</sup> argued that university students do not have a high concern about this issue. In contrast, as I surveyed, Figure 4 shows 54.4% of university students in Selangor sometime concerned about their location data security whilst 36% of them responded that they concerned about the said issue.<sup>31</sup> A substantial number of university students have concern when the issue of location privacy is in question. 78.4% of university students is concerned when their location data will be revealed to other parties.<sup>32</sup> Moore and DeBruhl's investigation<sup>33</sup> support my findings as university students most concerned about location data among the data shared over their smartphones.

Educational application software that uses MLS has also collected location data of university students and they send the data to unauthorized parties. Some of the educational app

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<sup>29</sup> Ahmad Khalil Lajan, "Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services."

<sup>30</sup> Chris Schmandt and Mark Ackerman, "Personal and Ubiquitous Computing: Issue on Privacy and Security," *Personal and Ubiquitous Computing* 8, no. 6 (2004): 389–90, <https://doi.org/10.1007/s00779-004-0306-7>.

<sup>31</sup> Ahmad Khalil Lajan, "Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services."

<sup>32</sup> Ibid.

<sup>33</sup> Marina Moore and Bruce DeBruhl, "Investigating University Student Desires and Use of Smartphone Privacy Settings," in *Papers of the 12th Annual CCSC Southwestern Conference*, vol. 34, 2019, 134–41.

collect them without asking for permission by the user. Shaw Academy app decided to collect location data and personal identifiers to a third-party marketing firm WebEngage.<sup>34</sup> Since the COVID-19 pandemic begun, Shaw Academy saw a soaring 800% increase of new registrations from students all over the globe.<sup>35</sup> There would be a considerable number of university students in Selangor that also have registered for the app. Mr. Aiman Zulhakim has stated that he has registered for the app and enrolled in their online academic courses.<sup>36</sup> Shaw Academy app in turn has collected location data of several university student in Selangor whenever they are accessing their online courses in the app. However, this is only accountable to one interviewed student, it is possible that there would be a significant amount of student enrolling online courses via the app, but it is also possible that there would only be a small number of students enrolling on the app. Mr. Mohamed Tariq Ziyad, a first-year undergraduate student in the National University of Malaysia said that he has never heard of the app.<sup>37</sup> Assuming that there are several university students subscribing to this app, there is a possibility that Shaw Academy invaded the privacy rights of these students. WebEngage did not explained on how the location data collected is used in their companies. It can be implied that WebEngage receives the information of enrolling students in Shaw Academy app. As a result, location data could be stolen from hackers and they would end up use this information to so harmful acts such as burglary, and spying. To support, Armending<sup>38</sup> commented about how using MLS apps will result in unwanted encounters which are stalking. Dating MLS apps are revealed to have high security vulnerabilities which has enabled hackers to access other user's location data and

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<sup>34</sup> CNET, “Education Apps Are Sending Your Location Data and Personal Info to Advertisers,” accessed January 29, 2021, <https://www.cnet.com/news/education-apps-are-sending-your-location-data-and-personal-info-to-advertisers/>.

<sup>35</sup> “Shaw Academy Reports Online Learning ‘New Normal’ Post-Lockdown.”

<sup>36</sup> Muhammad Hilmie Jalang Ahmad Khalil Lajan, “Personal Interview with Mr. Aiman Zulhakim,” 2020.

<sup>37</sup> Muhammad Hilmie Jalang Ahmad Khalil Lajan, “Personal Interview with Mr. Mohamed Tariq Ziyad Bin Mohamed Jahangir,” 2020.

<sup>38</sup> Taylor Armending, “Location-Tracking Turns Your Smartphone into Your Stalker | CSO Online,” CSO Online, accessed February 14, 2021, <https://www.csionline.com/article/2134113/location-tracking-turns-your-smartphone-into-your-stalker.html>.

eventually tracking their movements.<sup>39</sup> Thus, It is clear that the location data that they have collected is a result of their violation of their individual rights to privacy.

However, some educational apps or campus management apps collect location data from university student for the interest of campus security. This is because, in certain extraordinary events, students' location data is useful, even without consent.<sup>40</sup> This is worth noting because in unusual circumstances, emergency events such as natural disasters and sudden terrorist attacks would result in the emergency use of location data. By geospatial information systems and indoor positioning systems, higher educational institutions use the location information gathered through Bluetooth Beacon Technology to find students that are in distress during emergency events such as a bomb explosion.<sup>41</sup> However, this would only be available within the geo-fence, and in this case, it would be the university campus. With the availability of real-time data analytics and data from university students, college campuses would be able to plan and respond towards any suspicious behaviour. Even when the privacy of location information is protected, there is necessary standards to reveal the information to protect university students and not threaten the privacy of students. Should university students defend their privacy rights when their location data are actually saving them from eminent danger?

## 4.2 | Increasing Surveillance on Students

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<sup>39</sup> “How Stalkers Can Use Dating Apps to Track Your Current Location,” accessed February 18, 2021, <https://geoawesomeness.com/how-stalkers-can-use-dating-apps-to-track-your-current-location/>.

<sup>40</sup> Michael Weinlich et al., “Significant Acceleration of Emergency Response Using Smartphone Geolocation Data and a Worldwide Emergency Call Support System,” *PLoS ONE* 13, no. 5 (May 1, 2018), <https://doi.org/10.1371/journal.pone.0196336>.

<sup>41</sup> “Real-Time Data Analytics in Higher Education Is Improving Students Safety,” accessed January 29, 2021, <https://edtechmagazine.com/higher/article/2019/09/higher-education-institutions-leverage-real-time-data-analytics-keep-students-safe-perfcon>.



*Figure 5: Students' Response on their awareness regarding location apps accessing location data without consent<sup>42</sup>*

Student surveillance supplies the absolute capability for educational corporations to use their IT capability to check the actions of people. App developers have the ability to track movements of consumers by mining their personal location data, especially from educational apps using MLS.<sup>43</sup> However, this claim does not mention about the possibility of educational apps being the main issue for university students. This action can be questioned especially when users did not give the permission for the applications to supply their personal location data. In Selangor (see Figure 5), half of university students or 50.4 per cent has responded that they did not aware that a few location-based mobile applications can access their location data without their permission.<sup>44</sup> This can alternately be classified as an issue of surveillance when location-based application software developers decide to collect personal location tracking data. The New York Times<sup>45</sup> report support this as location data is collected from more than

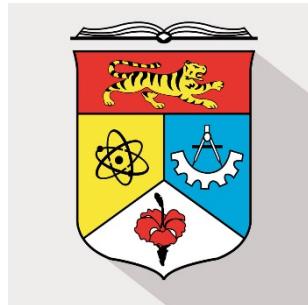
<sup>42</sup> Ahmad Khalil Lajan, "Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services."

<sup>43</sup> Michael Friedewald et al., *Surveillance, Privacy and Security, Surveillance, Privacy and Security*, 2017.

<sup>44</sup> Ahmad Khalil Lajan, "Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services."

<sup>45</sup> "Your Apps Know Where You Were Last Night, and They're Not Keeping It Secret - The New York Times," accessed February 14, 2021, <https://www.nytimes.com/interactive/2018/12/10/business/location-data-privacy-apps.html>.

500 mobile apps and is sent to location firms to oversee the movement of users without the authorization from users. Though, this report only observes privacy concerns in the United States. Arguably, it is possible that educational apps are also involved in terms of surveillance and monitoring of university students in Selangor.



*Figure 6: MyUKM Mobile App<sup>46</sup>*

In spite of this, some university applications rely on the location data provided by students for efficient learning environment. In Selangor, university management use application software to monitor student attendance. It is done to make sure students are attending to all the lectures with full focus.<sup>47</sup> Students believe that giving away their location data is not a problem because students understand the nature of the app, which is they were compelled to give out their location data to their lecturers and university management. For example, MyUKM is an app developed by the National University of Malaysia (UKM) with the main purpose to inform students on the latest information about university activities and serves as the attendance system with the SmartAttendance feature.<sup>48</sup>

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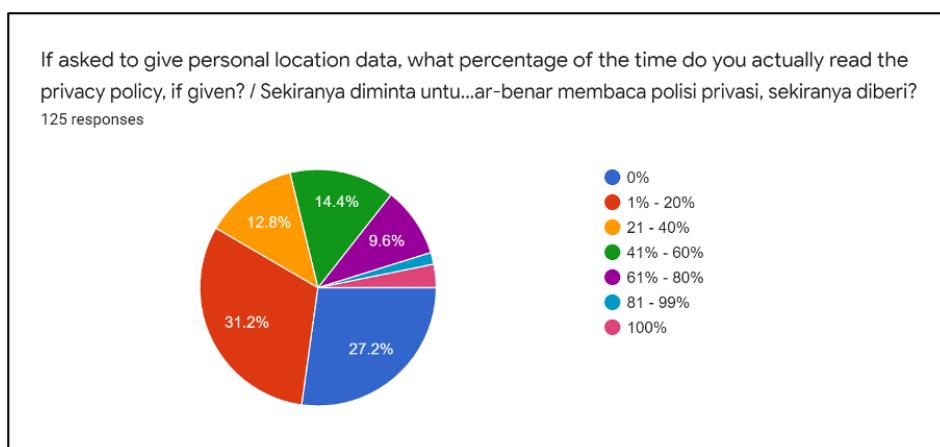
<sup>46</sup> “SignQRin,” accessed January 30, 2021, <https://myukm.ukm.my/signqrin/>.

<sup>47</sup> “Education Technology: Schools Are Using Apps To Collect Student Data, Track Attendance | Teen Vogue,” accessed January 29, 2021, <https://www.teenvogue.com/story/education-technology-student-attendance-data>.

<sup>48</sup> “SignQRin.”

The privacy details in Google Play Store<sup>49</sup> include location data requirements of precise location data by GPS and network-based system. This means that MyUKM app requires the permission of UKM students to supply their location data to them.<sup>50</sup> This mass surveillance system is acceptable as it intends to track UKM students' movements for the right cause, which is to ensure that all students can obtain proper education through e-learning. Without this surveillance system, absenteeism is prone to happen due to the lack of physical monitoring towards university students.<sup>51</sup> Indirectly, this will ensure that the reputation of the university as one of the best universities in Malaysia, according to QS University Rankings, is kept.<sup>52</sup> Although some educational apps insist on doing mass surveillance towards university students these apps have their best intentions to monitor them for online learning efficiency.

#### 4.3 | Non-User-Friendly Privacy Policies



*Figure 7: The response of Selangor university students about the time of reading privacy policies<sup>53</sup>*

<sup>49</sup> “MyUKM - Apps on Google Play,” accessed January 30, 2021, <https://play.google.com/store/apps/details?id=my.ukm.myukm&hl=en&gl=US>.

<sup>50</sup> Ahmad Khalil Lajan, “Personal Interview with Mr. Mohamed Tariq Ziyad Bin Mohamed Jahangir.”

<sup>51</sup> Jesús Valverde-Berrocuso et al., “Trends in Educational Research about E-Learning: A Systematic Literature Review (2009-2018),” *Sustainability (Switzerland)* 12, no. 12 (2020), <https://doi.org/10.3390/su12125153>.

<sup>52</sup> “UKM Ranked Second among Malaysian Universities | The Star,” accessed February 15, 2021, <https://www.thestar.com.my/news/education/2020/03/29/ukm-ranked-second-among-malaysian-universities>.

<sup>53</sup> Ahmad Khalil Lajan, “Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services.”

Students might not aware that some privacy policies have crucial information about the collection and distribution of their data across the Internet.<sup>54</sup> From the survey conducted (see Figure 7), only 3.2 percent of university students read the privacy policies in application software. This is a very alarming number when 96.8 percent of respondents does not read the privacy policies.<sup>55</sup> This implies that an exceptionally large majority of students do not read the privacy policies, which increases their vulnerability of their personal data to be stolen or collected by location services application software. Nili Steinfeld<sup>56</sup> investigated that undergraduate students indeed did not read the privacy policies online when there is a choice of skipping the said document altogether. Steinfeld argued that undergraduate spend less time to read the documents because of their sense of reassurance that clicking on the link containing the privacy policy.<sup>57</sup> However, Maor Weinberger et al.<sup>58</sup> argued that lack of attention of students is not the main reason why privacy policies are ignored indefinitely. There are other factors to the reason university students tend to not read them. First, privacy policies are too incomprehensible for readers to read. The language use of privacy policies is put onto a standard where only college and university educated people will understand.<sup>59</sup> Additionally,

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<sup>54</sup> Kirsten Martin and Katie Shilton, “Putting Mobile Application Privacy in Context: An Empirical Study of User Privacy Expectations for Mobile Devices,” *Information Society* 32, no. 3 (2016): 200–216, <https://doi.org/10.1080/01972243.2016.1153012>.

<sup>55</sup> Ahmad Khalil Lajan, “Survey Report on the Awareness of University Students in Selangor, Malaysia on the Violation of Individual Rights to Privacy through the Use of Mobile Location Services.”

<sup>56</sup> Nili Steinfeld, “‘I Agree to the Terms and Conditions’: (How) Do Users Read Privacy Policies Online? An Eye-Tracking Experiment,” *Computers in Human Behavior* 55 (2016): 992–1000, <https://doi.org/10.1016/j.chb.2015.09.038>.

<sup>57</sup> Ibid.

<sup>58</sup> Maor Weinberger, Dan Bouhnik, and Maayan Zhitomirsky-Geffet, “Factors Affecting Students’ Privacy Paradox and Privacy Protection Behavior,” *Open Information Science* 1, no. 1 (2017): 3–20, <https://doi.org/10.1515/opis-2017-0002>.

<sup>59</sup> “Opinion | We Read 150 Privacy Policies. They Were an Incomprehensible Disaster.,” New York Times, accessed January 30, 2021, <https://www.nytimes.com/interactive/2019/06/12/opinion/facebook-google-privacy-policies.html?mtrref=www.google.com&assetType=REGIWALL>.

the technological terminologies contained in privacy policies tend to be incomprehensible as well, especially by students who have little to none IT study background.<sup>60</sup>

Dictionary.com and Thesaurus.com educational application, has been reported to have incomprehensible privacy policy. According to New York Times, the application's privacy policy contains between 1400 to 1500 words, takes 20 to 25 minutes to read the whole policy, and the language use of the policy is at professional career which is very hard for university students to comprehend the document.<sup>61</sup> The privacy policy provided by the application has stated that they would use mobile location information to tailor the service provided by the application and also for advertising personalization.<sup>62</sup> In this case, there is a possibility the location data from university students using this app is exposed and is distributed to other parties without their absolute intentions. Their individual rights to privacy have been violated since they do not aware of the intentions of the application collecting their location data.

At some cases, even when university students insist to not read the privacy policies from educational MLS apps, their privacy rights remained not violated. This is because some privacy policies do state that their location data is only collected and will not distributed to any third-party associates. The privacy policy provided by the Quizlet app require 20 to 25 minutes to read the entire policy with a readability score of between 1400 to 1500, which require professional career understanding of the language use.<sup>63</sup> According to their privacy policy, it states that the developers do not request to collect location data of students when using the app, but it does state that they have to ask the consent of their users if they want to share it to third

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<sup>60</sup> Martin and Shilton, "Putting Mobile Application Privacy in Context: An Empirical Study of User Privacy Expectations for Mobile Devices."

<sup>61</sup> "Opinion | We Read 150 Privacy Policies. They Were an Incomprehensible Disaster."

<sup>62</sup> "Terms of Service & Privacy Policy - Dictionary.Com," accessed January 31, 2021, <https://www.dictionary.com/e/terms/>.

<sup>63</sup> "Opinion | We Read 150 Privacy Policies. They Were an Incomprehensible Disaster."

parties.<sup>64</sup> In this case, university students will not be worried if their location data is exposed because the privacy policy already stated that they would have to ask consent for distribution. This means that their individual rights to privacy will not be violated even if they choose to not read the privacy policy given by the educational app developers.

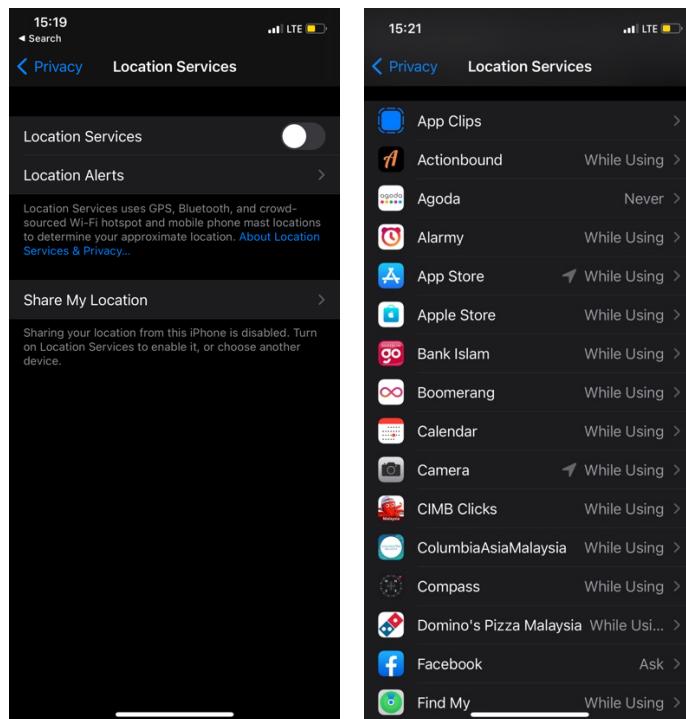
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<sup>64</sup> ‘Privacy Policy | Quizlet,’ accessed January 31, 2021, <https://quizlet.com/privacy>.

## 5.0 | Solutions

### 5.1 | Disable Location Services, When Necessary

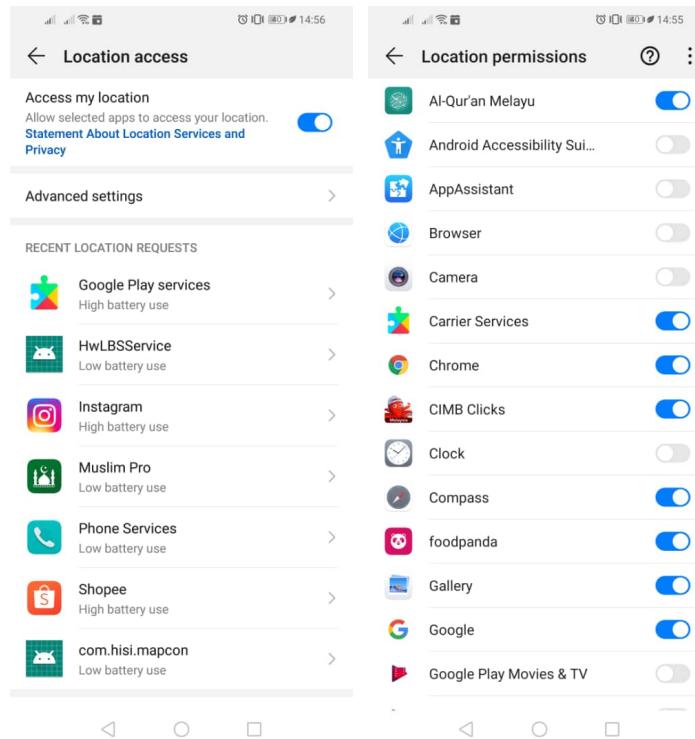
The first solution that can be done by university students to ensure that their individual rights to privacy is at the best possible rate is to always have the ultimate initiative to realize that there should be aware of the location settings in all applications. This should be done by the university students as there are the ones that have granted the access to the application software to their personal location data. Therefore, they would also have the power to change the location settings in all application software.



*Figure 8: Location Settings on iOS smartphones*

If university students were using iOS mobile phones (see Figure 8), which are the iPhones, therefore, it would be easy to change the location settings in every application

software. In this case, they can simply continue to tap on the Settings icon at their application menu. After that, find any application software that have settings about location data, such as Instagram. There are a few options to choose on the location settings such Never, Ask Next Time, or While Using the App. If the university student chooses to never allow location access to any educational app, so the app will have minimal chance to access and collect the personal location data. This will ensure their individual rights to privacy is preserved according to the personal preference of university students.



*Figure 9: Location Settings on Android smartphones*

For Android phones (see Figure 9), university students can simply turn off their location settings by go to ‘Settings’, there would be options to restrict location access, either generally or according to applications. Generally, they can go to ‘Security and Privacy’ and click on the ‘Location access’. Slide the tab on ‘Access my location’ to the left to turn off all location access for all apps. If they want to turn off location access in certain apps, they can go to ‘Apps’,

‘Permissions’ then ‘Location permissions’ and slide the tab on any application to the left to turn off specific location access on the said app.

## 5.2 | Improvements on Privacy Protection Laws

Legislators should make more improvements regarding privacy laws in Malaysia. The government of Malaysia have already enacted laws regarding privacy laws for their citizens. The Personal Data Protection Act (PDPA) 2010, safeguards the personal data of individuals online.<sup>65</sup> However, the statute does not place any provisions regarding the protection of location data of individuals.<sup>66</sup> This means that the location data of university students in Selangor is vaguely considered by the Government as a personal data. It is impactful to the university students in Selangor when all these sensitive data will be accessible even if these authorities do not have the permission or consent from the government. It indicates that governments and/or multinational authorities do not have the authority to protect location data from developers of education apps using MLS.

Thus, Malaysian legislators should propose a special provision for location data protection. For example, The European Union introduced the General Data Protection Regulation, which the focus of the act is to protect any digital including location data.<sup>67</sup> The Malaysian government should set the EU’s data protection law as their main benchmark to ensure the privacy laws in Malaysia will protect the individual rights to privacy of citizens, including university students. mandating features that can protect location data of university

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<sup>65</sup> Zuryati Mohamed Yusoff, “The Malaysian Personal Data Protection Act 2010: A Legislation Note.,” *New Zealand Journal of Public and International Law* 9, no. 1 (2011).

<sup>66</sup> “Online Privacy in Malaysia - DLA Piper Global Data Protection Laws of the World,” accessed January 31, 2021, <https://www.dlapiperdataprotection.com/index.html?t=online-privacy&c=MY>.

<sup>67</sup> “What the GDPR Will Mean for Companies Tracking Location,” accessed January 31, 2021, <https://iapp.org/news/a/what-the-gdpr-will-mean-for-companies-tracking-location/>.

students in Malaysia including Selangor. Features such as educator control over an educational app should be mandated.<sup>68</sup> This would ensure that lecturers and educators have the access to the data, and if necessary, they can delete the information and distribution of location data can be prevented.<sup>69</sup>

However, the law should always be regulated by the Government. Lack of law enforcement will result in low protection of personal data for citizens, including university students in Selangor and the laws will likely to be ignored. This will result in higher violation of individual rights to privacy.

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<sup>68</sup> “E-Reader Apps and Devices Are Having a Moment, but Which Ones Protect Your Privacy? | Common Sense Education,” accessed January 31, 2021, <https://www.commonsense.org/education/articles/e-reader-apps-and-devices-are-having-a-moment-but-which-ones-protect-your-privacy#WhatAreTheRisks>.

<sup>69</sup> Ibid.

## 6.0 | Conclusion

As a conclusion, the use of MLS among university students in Selangor have caused their privacy rights to be threatened as some educational apps using MLS have stolen their location data and distributing them to other third parties. They do realize about the violation but simply ignore the consequences of it. However, due to unusual circumstances, the actions of giving away privacy to university app developers, particularly, have resulted in their efficient planning and response in emergency events. Second, surveillance by educational apps have encouraged mining of their location data. However, university apps use students' location data to track their attendance during university lectures to ensure efficient learning outcome online. Finally, non-user-friendly privacy policies influence university students in Selangor to give away their individual privacy rights. However, certain educational apps using MLS does not use their location data to be distributed to other people which means it is safe for university students to use, even if they do not read the binding terms provided for them.

A few solutions have been introduced. First, university students should always be aware to alter privacy settings on their phones. The government should aware that the privacy policy in Malaysia is vague in protection of location data and there should be improvements in terms of safeguarding the privacy rights of Malaysians online, especially regarding location data.

The positive evaluations from the issues are a clear acknowledgement that university students in Malaysia will remained exposed to the disclose of sensitive location information. However, this essay focuses on the implications of students in education, and not in other areas of impact. It is hoped that there should be an extension of research regarding the use of MLS for adult teens especially the area of impact of social engagements. Ultimately, it will remain

unresolvable that the privacy concerns through the use of MLS can be eliminated indefinitely but there should be an assurance that solutions will always be made to ensure that the individual rights to privacy will always be protected digitally.

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## Appendices

### Appendix 1: Interview Transcript 1

This interview is conducted with interviewee, Mr. Mohamed Tariq Ziyad bin Mohamed Jahangir. He is a first-year university student at National University of Malaysia (UKM), Bangi Campus, Selangor. The interview was conducted online on Saturday, 19 December 2020. The platform used for the interview was Zoom Cloud Meetings.

Acronym: IVR = Interviewer, MTZ = Mohamed Tariq Ziyad (Interviewee)

- IVR: Can you introduce briefly about yourself?
- MTZ: My name is Mr. Mohamed Tariq Ziyad bin Mohamed Jahangir. I am a first-year undergraduate student at the National University of Malaysia (UKM).
- IVR: Are you majoring in Information Technology or taking any IT-related subjects at some point in your current university?
- MTZ: Yes, I am currently taking Computer Science courses.
- IVR: What brand of smartphone are you currently using?
- MTZ: I'm currently using Xiaomi smartphone brand.
- IVR: What is your trend of mobile phone usage for the past 30 days?
- MTZ: I use it quite frequently. I would say that I use my smartphone every day. I use it around 7-8 hours a day.
- IVR: In your opinion, what does privacy means?
- MTZ: Personally, I think that privacy is the ability to do your own personal activities without being observed or monitored from any other third parties.
- IVR: Do you think that the use of mobile phones can be invasive to your privacy?
- MTZ: Geo-tracking is a common occurrence to track the locations of your pictures. If you update them on any social media platform, it solidifies the purpose of location sharing in the social environment that you are in. It is also quite common to be exposed to browser tracking. Users mainly focus on their laptop privacies a lot of time. We do not see a lot of users installing anti-virus or anti-malware protection in their phones these days. The use of Virtual Private

Networks (VPNs) is not common in the general public, but it is common among university students

IVR: Are you aware of the terminology of ‘location data’ before this interview?

MTZ: Yes, I am.

IVR: What mobile location-based service applications you most frequently use in your smartphone?

MTZ: I would say the common application I use is for navigation purposes such as Waze. I also commonly use the Foodpanda app.

IVR: Do your university has a mobile application on your attendance, courses, etc.

MTZ: Yes. It’s called as MyUKM.

IVR: Do you know if the application can access your location data?

MTZ: Yes. The application is basically for attendance in which whenever the lecture begins, students will be given a QR code to scan. When you scan the QR code, it will give the information of your lecture, the time of you attending the lecture, and where are you scanning it from.

IVR: Are you aware of the existence of an app called Shaw Academy?

MTZ: No, I have not heard about the app.

IVR: In general, why are you concerned about your location data security on the Internet?

MTZ: I concern that the information is available to any third parties that aim to do harm. This is because your data will always be available for your application services and mobile Internet provider. I just hope that the information is not revealed to the public or anyone that can cause any harm.

IVR: Have you been asked to provide location tracking data at location-based applications you visit?

MTZ: Yes.

IVR: Have you or any of your university colleagues’ privacy been violated through the use of mobile location services?

MTZ: No.

IVR: In your opinion, do you agree that your location data is personal or sensitive to unauthorized users?

MTZ: Yes.

IVR: Do you spend time reading privacy policies provided by application software developers? And why?

AZ: No. I feel like that privacy policies are not friendly to users especially for laymen who do not know the IT terms by app developers. I also think that

IVR: In your opinion, do you agree that these online privacy laws such as Personal Data Protect Act 2010 effectively safeguard the individual rights to online privacy in Malaysia?

MTZ: Yes. With the protection act, I have read that there is a significant decrease of the amount of people abusing the data in location-based services.

## Appendix 2: Interview Transcript 2

This interview is conducted with interviewee, Mr. Aiman Zulhakim. He is a second-year university student at Universiti Utara Malaysia (UUM), Kuala Lumpur Campus, Selangor. The interview was conducted online on Saturday, 19 December 2020. The platform used for the interview was Zoom Cloud Meetings.

Acronym: IVR = Interviewer, AZ = Aiman Zulhakim (Interviewee)

- IVR: Can you introduce briefly about yourself?
- AZ: My name is Aiman Zulhakim. I am a second-year undergraduate student at the National University of Malaysia (UKM).
- IVR: Are you majoring in Information Technology or taking any IT-related subjects at some point in your current university?
- AZ: I took Basics of Computer Applications as one of the subjects in my undergraduate course.
- IVR: What brand of smartphone are you currently using?
- AZ: I'm currently using an iPhone 7.
- IVR: How frequently you use your mobile phone in the past 30 days?
- AZ: I use my smartphone every single day. I would say that I use my mobile phone about 6 hours a day.
- IVR: In your opinion, what does privacy means?
- AZ: Privacy to me is the activities that I do in my daily life is personal and it would not be known to others and to the general public.
- IVR: Do you think that the use of mobile phones can be invasive to your privacy?
- AZ: Absolutely. This is because if you tend to update your information on the Internet such as personal photos and location, I will say that this is already an invasion to my privacy because we chose to expose ourselves to other parties.
- IVR: Are you aware of the terminology of 'location data' before this interview?
- AZ: No, I am not.
- IVR: What mobile location-based service applications you most frequently use in your smartphone?

- AZ: First is Google Maps, because I use it for navigation. Second one is Life360. My family and I subscribed to their service and they update our location everywhere.
- IVR: Do your university has a mobile application on your attendance, courses, etc.
- AZ: Yes. It is called as UUM Student app.
- IVR: Do you know if the application can access your location data?
- AZ: Yes, I do. At the bottom part of our app, it states our location. When we are scanning our attendance, we scan the QR code first. After that, we have to enter certain information to authenticate our attendance of the lecture. One of them is the location and the application will automatically detect the coordinates of our device, which clearly shows the application tracks our accurate location.
- IVR: Are you aware of the existence of an app called Shaw Academy?
- AZ: Yes, I know about it. In fact, I have participated in their online courses for the past two months.
- IVR: In general, why are you concerned about your location data security on the Internet?
- AZ: Yes, I would say I am a little bit concerned. This is because if the data falls into the wrong person, it would jeopardize my privacy.
- IVR: Have you been asked to provide location tracking data in location-based applications that you have visit?
- AZ: Yes. Some of the apps that I use always ask me to confirm my location, so it prompts to consent my personal location data to these apps.
- IVR: Have you or any of your university colleagues' privacy been violated through the use of mobile location services?
- AZ: As far as I know, no.
- IVR: In your opinion, do you agree that your location data is personal or sensitive to unauthorized users?
- AZ: Yes. I do agree that our location data is completely personal, and it should not be exposed to unauthorized people.
- IVR: Do you spend time reading privacy policies provided by application software developers? And why?
- AZ: No. I decide to not read the privacy policies because it is too much to read. I want to be quick when it comes to register any application software. Also, I

feel that there are many terminologies in the privacy policies that I don't understand.

IVR: In your opinion, do you agree that these online privacy laws such as Personal Data Protect Act 2010 effectively safeguard the individual rights to online privacy in Malaysia?

AZ: In opinion, I do think that laws safeguarding individual's right to privacy is sufficient. I think that the government has made a right decision in introducing the law to protect the citizens' digital privacy.

## Appendix 3: Survey Questionnaire Form

# Survey on the Awareness of University Students in Selangor, Malaysia on the Violation of the Individual Rights to Privacy through the Use of Mobile Location Services

**\*Required**

This survey aims to collect information on the consciousness and understanding of university students in the state of Selangor, Malaysia, regarding the violation of the individual rights to privacy through the use of mobile location services, especially location-based applications. This survey is conducted in English, followed by Bahasa Melayu.

The information collected will be evaluated for the creation of an Extended Essay for the subject Information Technology in a Global Society (ITGS) as required in the International Baccalaureate Diploma Program (IBDP).

The information is gathered by Muhammad Hilmie Jalong bin Ahmad Khalil Lajan, a first-year International Baccalaureate (IB) Diploma student from MARA College Banting, Selangor. All personal information provided shall only be used by the researcher and will not be shared with any third party without consent. For any questions related to the survey, please contact this phone number +601162603012 or email to [hilmiejalong@outlook.com](mailto:hilmiejalong@outlook.com).

*Kaji selidik ini bertujuan untuk mengumpul maklumat mengenai kesedaran dan kefahaman pelajar-pelajar universiti di negeri Selangor, Malaysia, mengenai pelanggaran hak privasi individu melalui penggunaan perkhidmatan lokasi mudah alih (mobile location services), terutamanya aplikasi berdasarkan lokasi (location-based applications). Kaji selidik ini dijalankan dalam bahasa Inggeris, dilanjut dengan bahasa Melayu.*

*Maklumat yang dikumpul akan dinilai dalam penghasilan sebuah Extended Essay bagi subjek Information Technology In a Global Society (ITGS) seperti yang termaktub dalam Program Diploma International Baccalaureate (IBDP).*

*Maklumat ini dikumpul oleh Muhammad Hilmie Jalong bin Ahmad Khalil Lajan, pelajar Diploma International Baccalaureate (IB) dari Kolej MARA Banting, Selangor. Semua maklumat peribadi yang disediakan hanya akan digunakan oleh penyelidik dan tidak akan dikongsikan dengan mana-mana pihak ketiga tanpa kebenaran. Untuk sebarang pertanyaan berkaitan dengan kaji selidik ini, sila hubungi nombor telefon ini +601162603012 atau e-mel kepada [hilmiejalong@outlook.com](mailto:hilmiejalong@outlook.com).*

**Section I: Personal Information / Bahagian I: Maklumat Diri**

**1. Gender / Jantina \***

*Mark only one oval.*

- Female / Perempuan
- Male / Lelaki

**2. Age range \***

*Mark only one oval.*

- 17 years old and below / 17 tahun dan ke bawah
- 18 - 22 years old / 18 - 22 tahun
- 23 - 27 years old / 23 - 27 tahun
- 28 - 32 years old / 28 - 32 tahun
- 33 - 37 years old / 33 - 37 tahun
- 38 - 42 years old / 38 - 42 tahun
- 43 years old and above / 43 tahun dan ke atas

**Section II: Current Educational Background / Bahagian II: Latar Belakang Pengajian Yang Sedang Diikuti**

This section requires the current educational information of the respondent. / Bahagian ini memerlukan maklumat-maklumat pengajian responden pada masa ini.

**3. Current level of study / Tahap pengajian yang sedang diikuti \***

*Mark only one oval.*

- Pre-undergraduate studies (including Foundation, Diploma and equivalent) / Pengajian prasiswazah (termasuk Asasi, Diploma dan setaraf)
- Undergraduate studies / Pengajian siswazah
- Postgraduate studies / Pengajian pascasiswazah

**4. Type of higher educational institution / Jenis institusi pengajian tinggi \***

*Mark only one oval.*

- Public University / Universiti Awam (UA)
- Private Higher Educational Institution / Institusi Pengajian Tinggi Swasta (IPTS)

5. Are you a local or an international student? / Adakah anda seorang pelajar tempatan atau pelajar antarabangsa? \*

*Mark only one oval.*

- Local student / Pelajar tempatan  
 International student / Pelajar antarabangsa

6. Student Status / Status Pelajar \*

*Mark only one oval.*

- Full-time student / Pelajar sepenuh masa  
 Part-time student / Pelajar separuh masa

7. Are you majoring in Information Technology (IT) for your current study? / Adakah anda mengambil jurusan utama Teknologi Maklumat (IT) dalam pengajian yang sedang anda ikuti? \*

*Mark only one oval.*

- Yes / Ya  
 No / Tidak

8. Are you studying any IT-related subjects at some point in your current university study? / Adakah anda sedang mengikuti subjek-subjek berkaitan IT pada waktu tertentu dalam pengajian yang anda sedang ikuti? \*

*Mark only one oval.*

- Yes / Ya  
 No / Tidak

Section III: Your Smartphone  
Information / Bahagian III:  
Maklumat Telefon Pintar Anda

This section requires the information of your  
smartphone. / Bahagian ini memerlukan maklumat-  
maklumat mengenai telefon pintar anda.

9. Which brand of smartphone are you currently using? \*

Mark only one oval.

The Acer logo, featuring the word "acer" in a lowercase, italicized, green sans-serif font.

Acer



Apple

The Asus logo, consisting of the word "ASUS" in a bold, black, sans-serif font with a registered trademark symbol.

Asus

The BlackBerry logo, featuring the word "BlackBerry" in a bold, black, sans-serif font next to its signature "B" logo, which is composed of three horizontal bars of decreasing length.

Blackberry

The Google logo, with the word "Google" in its characteristic multi-colored, rounded font.

Google

The Honor logo, with the word "HONOR" in a bold, black, sans-serif font.

Honor

The HTC logo, with the letters "htc" in a large, green, lowercase, sans-serif font.The Huawei logo, with the word "HUAWEI" in a bold, black, sans-serif font.



HTC

Huawei



Lenovo



LG



Motorola



Nokia

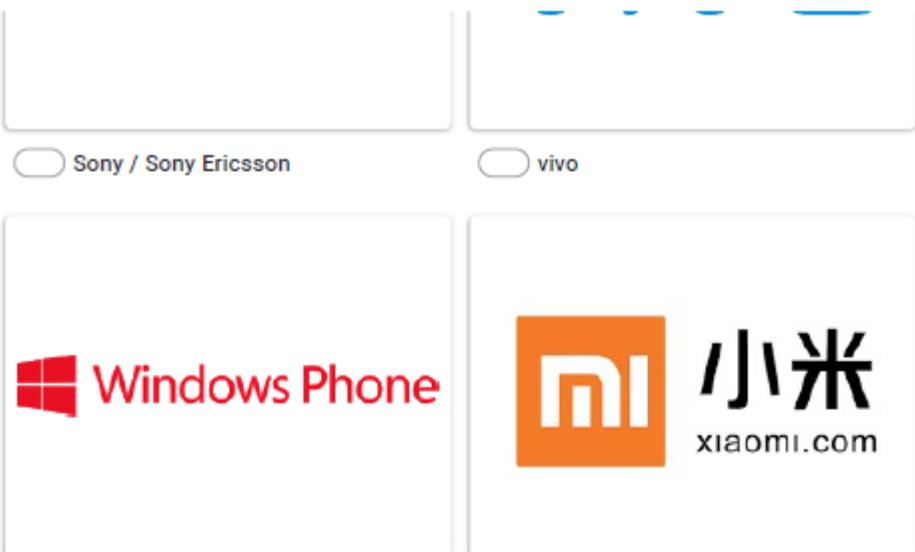


OPPO



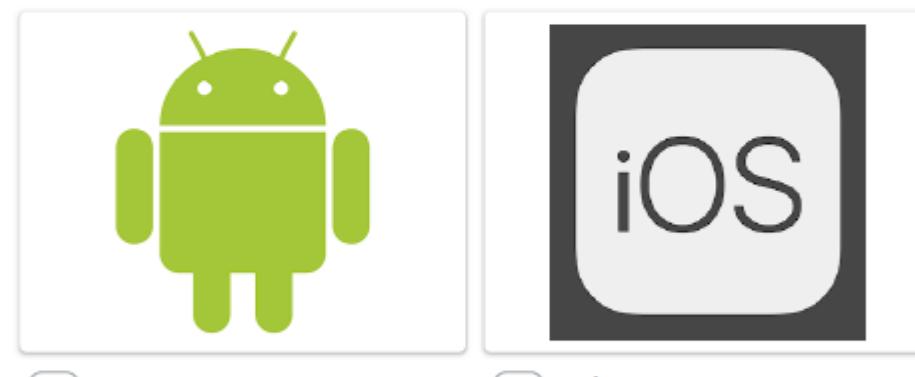
Samsung





10. What operating system is your smartphone currently operating under? / Apakah sistem operasi telefon pintar anda sedang gunakan? \*

*Mark only one oval.*



Android

Apple iOS

Other: \_\_\_\_\_

**Section IV: Frequency of Usage of Location-Based Services Applications /  
Bahagian IV: Kekerapan Penggunaan Aplikasi-Aplikasi Perkhidmatan Berdasarkan Lokasi**

This section assesses the frequency of your usage towards location based-applications in your smartphone in your daily life. / Bahagian ini menilai kekerapan penggunaan anda terhadap aplikasi-aplikasi berasaskan lokasi dalam telefon pintar anda dalam kehidupan seharian anda.

11. Which five (5) mobile location-based service applications you most frequently use in your smartphone? / Apakah lima (5) aplikasi-aplikasi mudah alih berdasarkan lokasi yang paling anda kerap gunakan dalam telefon pintar anda? \*

*Tick all that apply.*



foodpanda - Food Delivery



dahmakan



Foursquare City Guide



Google Maps - Transit & Food



Grab App



HappyFresh - Grocery Delivery





Life360: Find Family & Friends



Moovit: Public Transport Live



Muslim Pro: Azan, Quran, Qibla



Pokemon GO



Setel



Snapchat



Waze Navigation & Live Traffic



WhatsApp Messenger

Other:





WeChat

12. How often do you use these mobile location-based service applications in a week? / Dalam 30 hari terakhir ini, berapa kerapkah anda menggunakan aplikasi-aplikasi mudah alih berdasarkan lokasi ini dalam seminggu? \*

*Mark only one oval.*

- Once a week / Sekali seminggu
- 2 - 4 times a week / 2 - 3 kali seminggu
- 5 - 7 times a week / 5 - 7 kali seminggu
- More than 7 times a week / Lebih daripada 7 kali seminggu

**Section V: Understanding towards the Violation of Individual Rights to Privacy from the Usage of Mobile Location Services Applications /  
Bahagian V: Pengetahuan terhadap Pelanggaran Hak Privasi Individu daripada Penggunaan Aplikasi Mudah Alih Berdasarkan Lokasi**

This section assesses your awareness and understanding towards the violation of individual rights to privacy through your use of location based mobile applications. / Bahagian ini menilai kesedaran dan kefahaman anda terhadap pelanggaran hak privasi individu melalui penggunaan aplikasi-aplikasi mudah alih berdasarkan lokasi.

13. In general, how concerned are you about location data security on the Internet? (e.g people knowing your home address, finding out your current location etc.) / Secara umumnya, pada tahap manakah anda bimbang tentang perlindungan data lokasi dalam Internet? (Contohnya, orang lain mengetahui alamat rumah anda, mengetahui lokasi terkini anda dan sebagainya.) \*

Keep in mind that "location data security" can mean location privacy and confidentiality. / Diingatkan bahawa 'perlindungan lokasi' boleh dimaksudkan dengan privasi dan keselitan lokasi

*Mark only one oval.*

- Very concerned / Sangat bimbang
- Sometimes concerned / Kadang-kadang bimbang
- Only a little concerned / Hanya sedikit bimbang
- Not at all concerned / Langsung tidak bimbang

14. In general, why are you concerned about your location data security on the Internet? / Secara umumnya, mengapakah anda berasa bimbang mengenai perlindungan data lokasi dalam Internet? \*

*Tick all that apply.*

- It's not safe, someone could steal my information / Ianya tidak selamat, sesiapa sahaja boleh mencuri maklumat saya
- I don't know how my information will be used / Saya tidak mengetahui kaedah penggunaan maklumat saya
- I don't know who I'm dealing with / Saya tidak tahu dengan siapa saya berurusan
- I don't trust the websites with my information / Saya tidak yakin dengan laman-laman sesawang tersebut dengan maklumat saya
- I'm unfamiliar with how the technology works / Saya tidak mengenali kaedah penggunaan teknologi tersebut
- My privacy has been violated online / Privasi saya pernah dilanggar dalam talian
- I know of someone whose privacy has been violated online / Saya mengenali seseorang yang privasinya pernah dilanggar dalam talian

Other:

15. Are you aware that all location-based mobile applications require your permission to access your location data? / Adakah anda menyedari bahawa semua aplikasi mudah alih berdasarkan lokasi memerlukan kebenaran anda untuk mengakses data lokasi anda? \*

*Mark only one oval.*

- Yes / Ya
- No / Tidak

16. Are you aware that you can control your location settings in your smartphone? / Adakah anda menyedari bahawa anda boleh mengawal tetapan lokasi anda dalam telefon pintar anda? \*

*Mark only one oval.*

- Yes / Ya
- No / Tidak

17. In your opinion, do you agree that your location data is personal or sensitive to unauthorized users? / Bagi pendapat anda, adakah anda bersetuju bahawa data lokasi anda adalah bersifat peribadi dan sensitif terhadap pengguna-pengguna tanpa izin? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak

18. Are you aware that a number of location-based mobile applications can access your location data without your permission? / Adakah anda menyedari bahawa terdapat sebilangan aplikasi mudah alih berdasarkan lokasi yang boleh mengakses data lokasi anda tanpa kebenaran anda? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak

19. Are you aware that Malaysia has online privacy laws (e.g. The Personal Data Protection Act 2010) to safeguard the individual rights to privacy online before answering this survey? / Adakah anda menyedari bahawa Malaysia mempunyai undang-undang privasi dalam talian (cth. Akta Perlindungan Data Peribadi 2010) untuk menjaga hak privasi individu dalam talian sebelum anda menjawab tinjauan ini? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak

20. In your opinion, do you agree that these online privacy laws effectively safeguard the individual rights to online privacy in Malaysia? / Pada pendapat anda, adakah anda bersetuju bahawa undang-undang privasi dalam talian dapat menjaga hak privasi individu dalam talian secara berkesan? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak  
 I'm not sure / Saya tidak pasti

21. In your opinion, do you agree if the Parliament of Malaysia decided to restrict more individual rights to privacy in paramount situations for the benefit of society? / Pada pendapat anda, adakah anda bersetuju sekiranya Parlimen Malaysia bertindak untuk mengehadkan lebih banyak hak privasi individu dalam situasi-situasi mustahak demi kebaikan masyarakat? \*

For example, Parliament expects to allow location-based applications to compile personal location data for confirmed COVID-19 patients. / Sebagai contoh, Parlimen diharap membenarkan aplikasi-aplikasi berdasarkan lokasi untuk mengumpul data lokasi peribadi pesakit yang disahkan menghadapi jangkitan virus COVID-19

*Mark only one oval.*

- Yes / Ya
- No / Tidak

22. Have you been asked to provide location tracking data at location-based applications you visit? / Pernahkah anda diminta untuk memberikan data pengesanan lokasi pada aplikasi-aplikasi berdasarkan lokasi yang telah anda kunjungi? \*

*Mark only one oval.*

- Yes / Ya
- No / Tidak

23. If asked to provide personal location data, what percentage of the time do you refuse to give the requested personal information? / Sekiranya diminta untuk memberi data lokasi peribadi, berapa peratusan masakah anda menolak kebenaran untuk memberi maklumat tersebut? \*

*Mark only one oval.*

- 0%
- 1% - 20%
- 21 - 40%
- 41% - 60%
- 61% - 80%
- 81 - 99%
- 100%

24. If asked to give personal location data, what percentage of the time do you actually read the privacy policy, if given? / Sekiranya diminta untuk memberi data lokasi peribadi, berapa peratusan masakah anda benar-benar membaca polisi privasi, sekiranya diberi? \*

*Mark only one oval.*

- 0%
- 1% - 20%
- 21 - 40%
- 41% - 60%
- 61% - 80%
- 81 - 99%
- 100%

25. If you have refused to disclose personal location data, what are the reasons of the said action? / Sekiranya anda menolak dalam pemberian data lokasi peribadi, apakah sebab-sebab yang mendorong anda untuk berlaku sedemikian? \*

*Tick all that apply.*

- I am unfamiliar with the company/individual running the applications / Saya tidak mengenali individu/syarikat yang menjalankan aplikasi-aplikasi tersebut
- I don't trust the company/individual running the applications / Saya tidak yakin dengan individu/syarikat yang menguruskan aplikasi-aplikasi itu.
- The applications do not disclose how they plan to use my information / Aplikasi-aplikasi tersebut tidak menjelaskan kaedah mereka untuk menggunakan maklumat saya
- I generally prefer to be anonymous in these applications/ Secara umumnya saya lebih suka menjadi pengguna tanpa nama
- The value I will receive from the applications is not worth the information I give / Nilai yang saya terima daripada aplikasi-aplikasi tersebut apabila saya memberi maklumat tersebut adalah tidak berbaloi
- They asked for particularly sensitive pieces of location information (e.g. home address etc.) / Mereka meminta maklumat-maklumat lokasi sensitif (cth. alamat rumah sbg.)
- I am concerned that the information will be intercepted or stolen / Saya bimbang bahawa maklumat yang saya berikan akan dipintas atau dicuri
- I am concerned I will receive junk mail if I give my home address / Saya bimbang saya akan menerima mel-mel remeh sekiranya saya memberikan alamat rumah saya.
- I am concerned my life is in danger if I give my location data / Anda bimbang kehidupan saya dalam keadaan bahaya sekiranya saya memberikan data lokasi saya.

Other:

26. How important is the reputation of the company in your decision to give personal location data through these location-based applications? / Pentingkah reputasi sesebuah syarikat dalam pilihan anda untuk memberikan data lokasi peribadi anda melalui aplikasi-aplikasi berdasarkan lokasi ini? \*

*Mark only one oval.*

- Very important / Sangat penting
- Sometimes important / Kadang-kadang penting
- Only a little important / Hanya sedikit penting
- Not important at all / Langsung tidak penting

27. How important is your consent when location-based applications sell/share your location data with others? / Pentingkah kebenaran anda sekiranya aplikasi-aplikasi berdasarkan lokasi bertindak untuk menjual/berkongsi data lokasi anda kepada orang lain? \*

*Mark only one oval.*

- Very important / Sangat penting
- Sometimes important / Kadang-kadang penting
- Only a little important / Hanya sedikit penting
- Not important at all / Langsung tidak penting

28. How important is your consent when location-based applications physically track you movement and location? / Pentingkah kebenaran anda sekiranya aplikasi-aplikasi berdasarkan lokasi bertindak untuk mengesan pergerakan dan lokasi anda secara fizikal? \*

*Mark only one oval.*

- Very important / Sangat penting
- Sometimes important / Kadang-kadang penting
- Only a little important / Hanya sedikit penting
- Not important at all / Langsung tidak penting

29. Do you consider location-based applications tracking your physical location WITH your knowledge to be a violation of your individual rights to privacy? / Adakah anda menganggap aplikasi-aplikasi berdasarkan lokasi ini mengesan lokasi fizikal anda DENGAN pengetahuan anda sebagai pelanggaran hak privasi anda? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak

30. Do you consider location-based applications tracking your physical location WITHOUT your knowledge to be a violation of your individual rights to privacy? / Adakah anda menganggap aplikasi-aplikasi berdasarkan lokasi ini mengesan lokasi fizikal anda TANPA pengetahuan anda sebagai pelanggaran hak privasi anda? \*

*Mark only one oval.*

Yes / Ya  
 No / Tidak

31. Do you agree if your location data is being compiled by these location-based applications in paramount situations WITH your permission? / Adakah anda bersetuju sekiranya data lokasi anda dikumpul oleh aplikasi-aplikasi berdasarkan lokasi ini untuk situasi-situasi yang mustahak demi kebaikan masyarakat DENGAN kebenaran anda? \*

For example, if you are a confirmed case of the COVID-19 virus, your personal location tracking data is compiled to allow other people to know your location history. / Sebagai contoh, sekiranya anda disahkan menghadapi virus COVID-19, data lokasi peribadi anda akan dikumpulkan untuk membenarkan pengguna lain mengetahui sejarah lokasi anda.

*Mark only one oval.*

Yes / Ya  
 No / Tidak

32. Do you agree if your location data is being compiled by these location-based applications in paramount situations for the benefit of society WITHOUT your permission? / Adakah anda bersetuju sekiranya data lokasi anda dikumpul oleh aplikasi-aplikasi berdasarkan lokasi ini untuk kes-kes yang mustahak demi kebaikan masyarakat TANPA kebenaran anda? \*

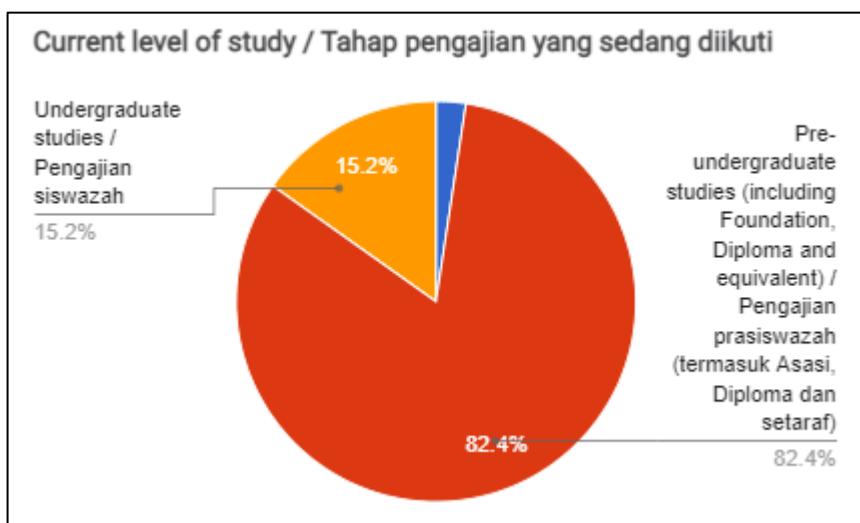
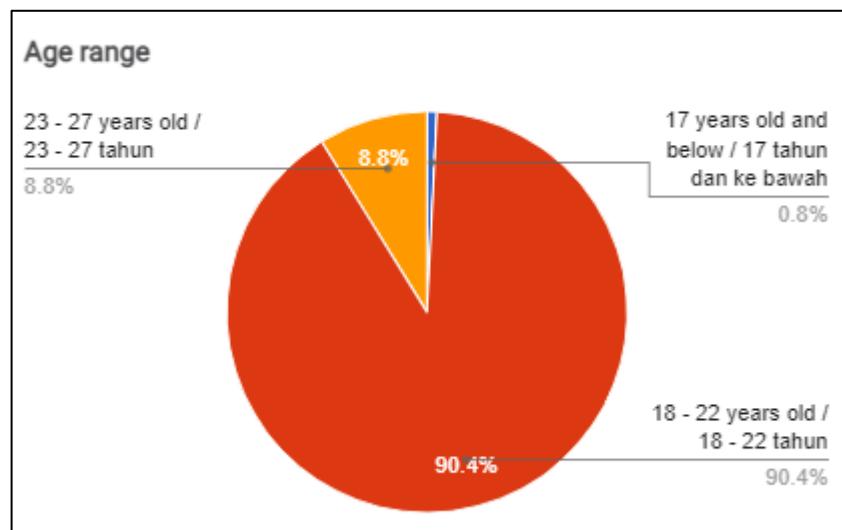
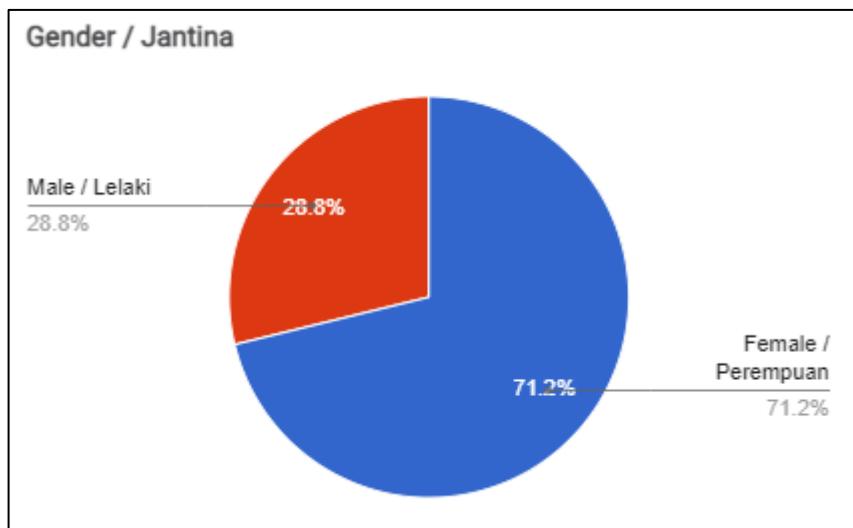
*Mark only one oval.*

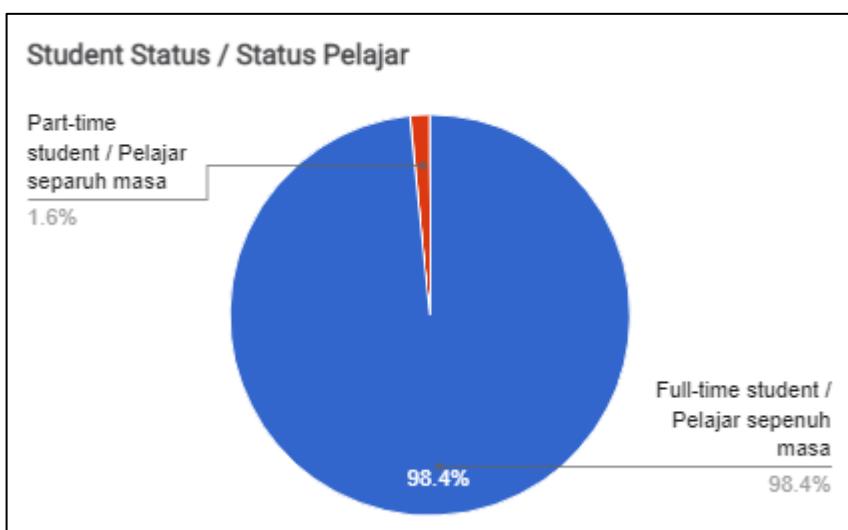
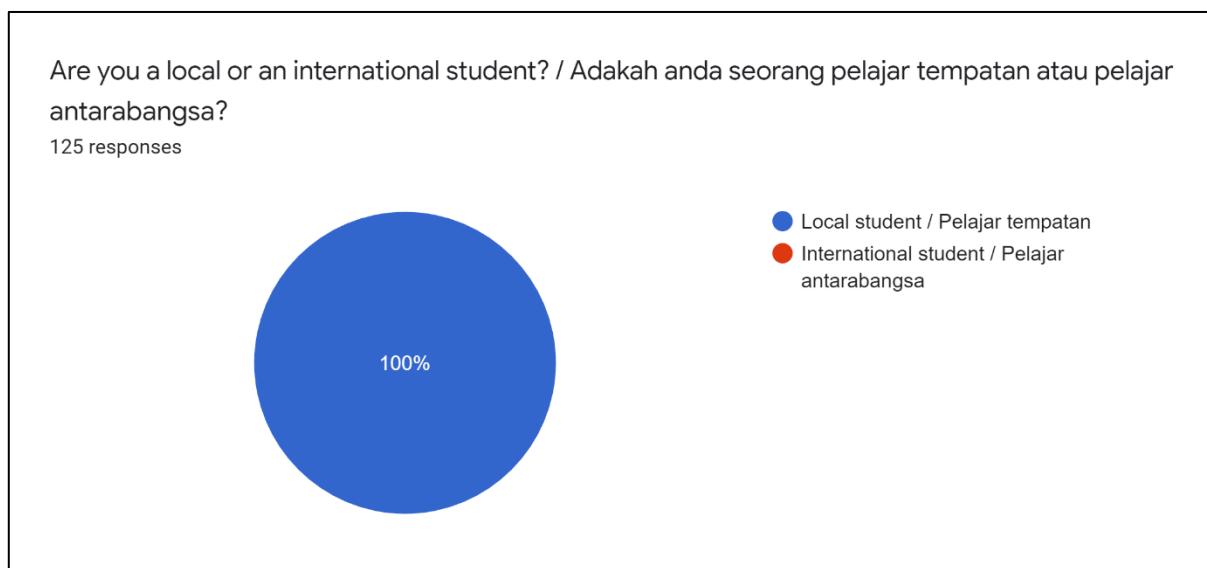
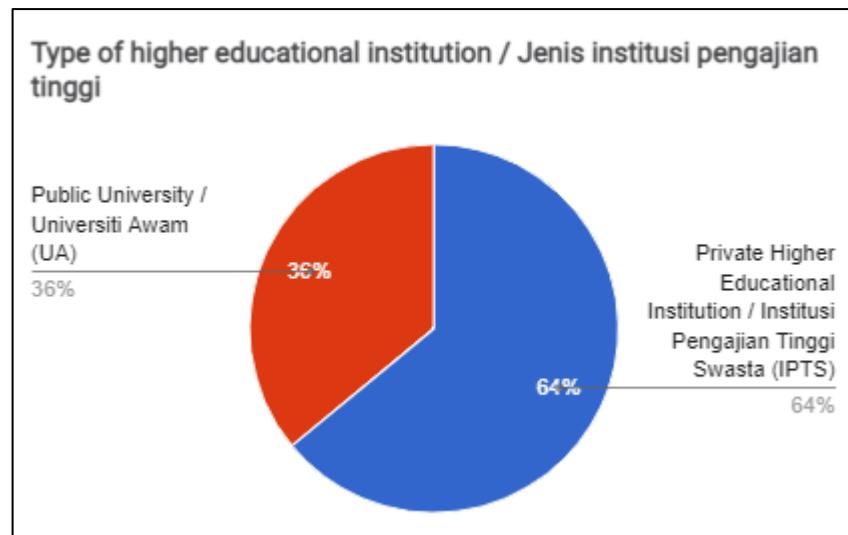
- Yes / Ya  
 No / Tidak
- 

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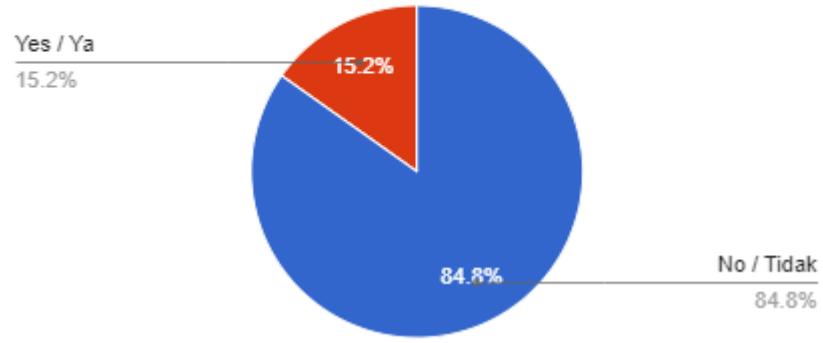
Google Forms

#### Appendix 4: Questionnaire Summary Responses

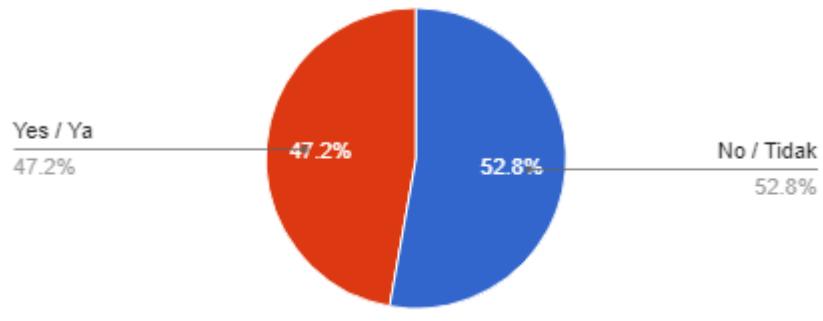


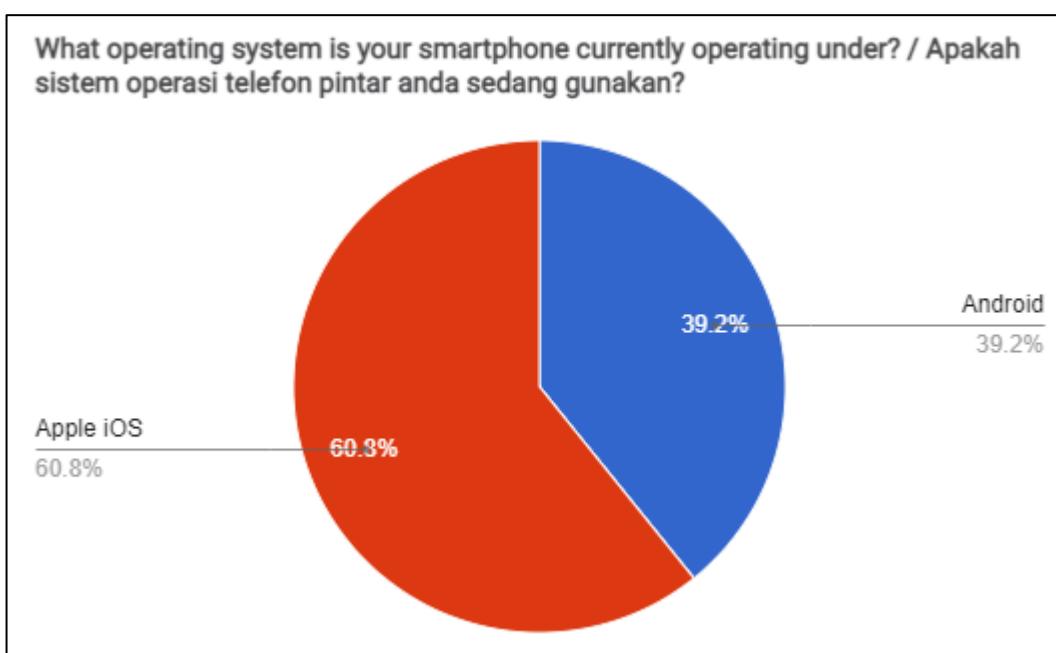
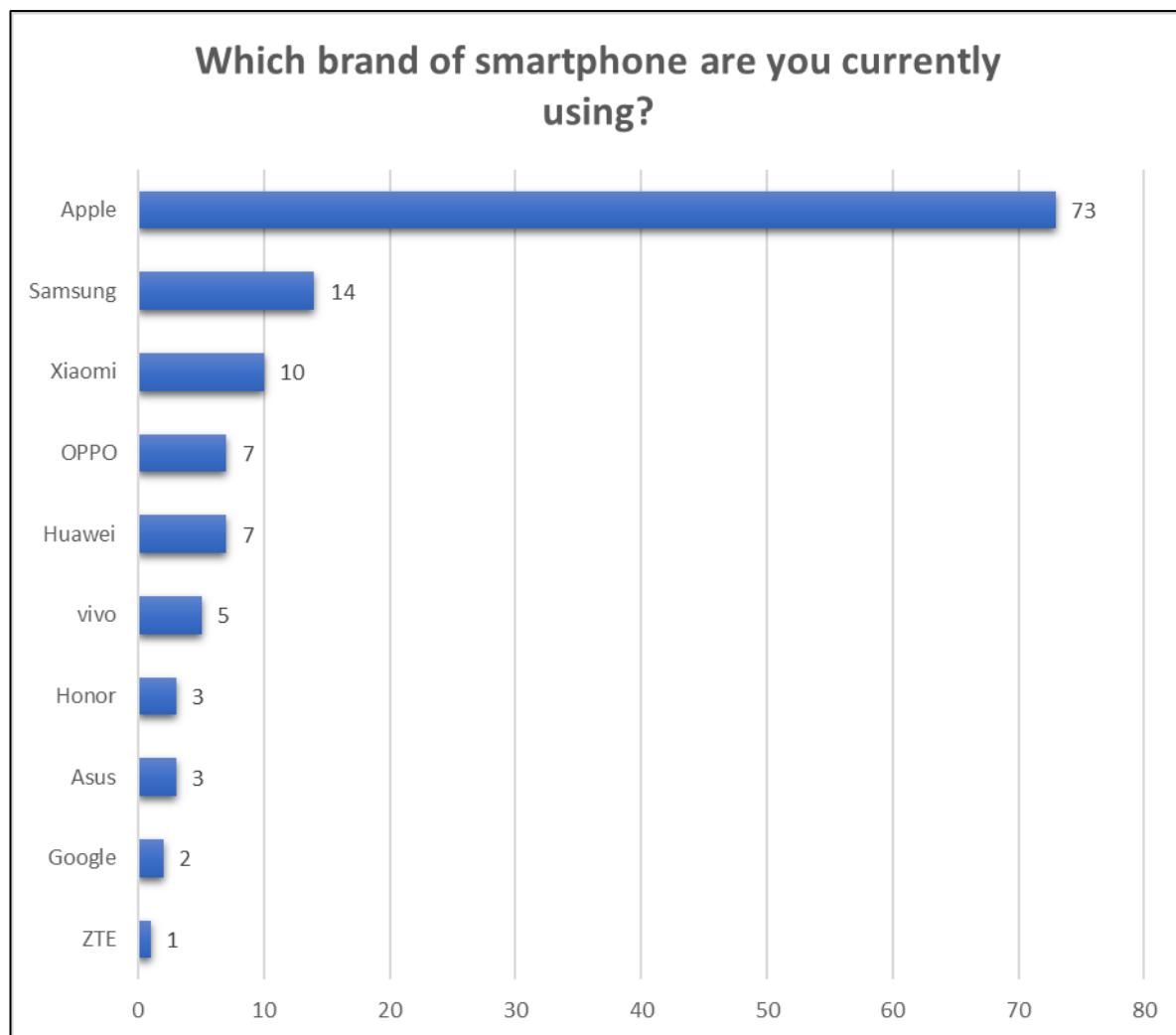


Are you majoring in Information Technology (IT) for your current study? / Adakah anda mengambil jurusan utama Teknologi Maklumat (IT) dalam pengajian yang sedang anda ikuti?

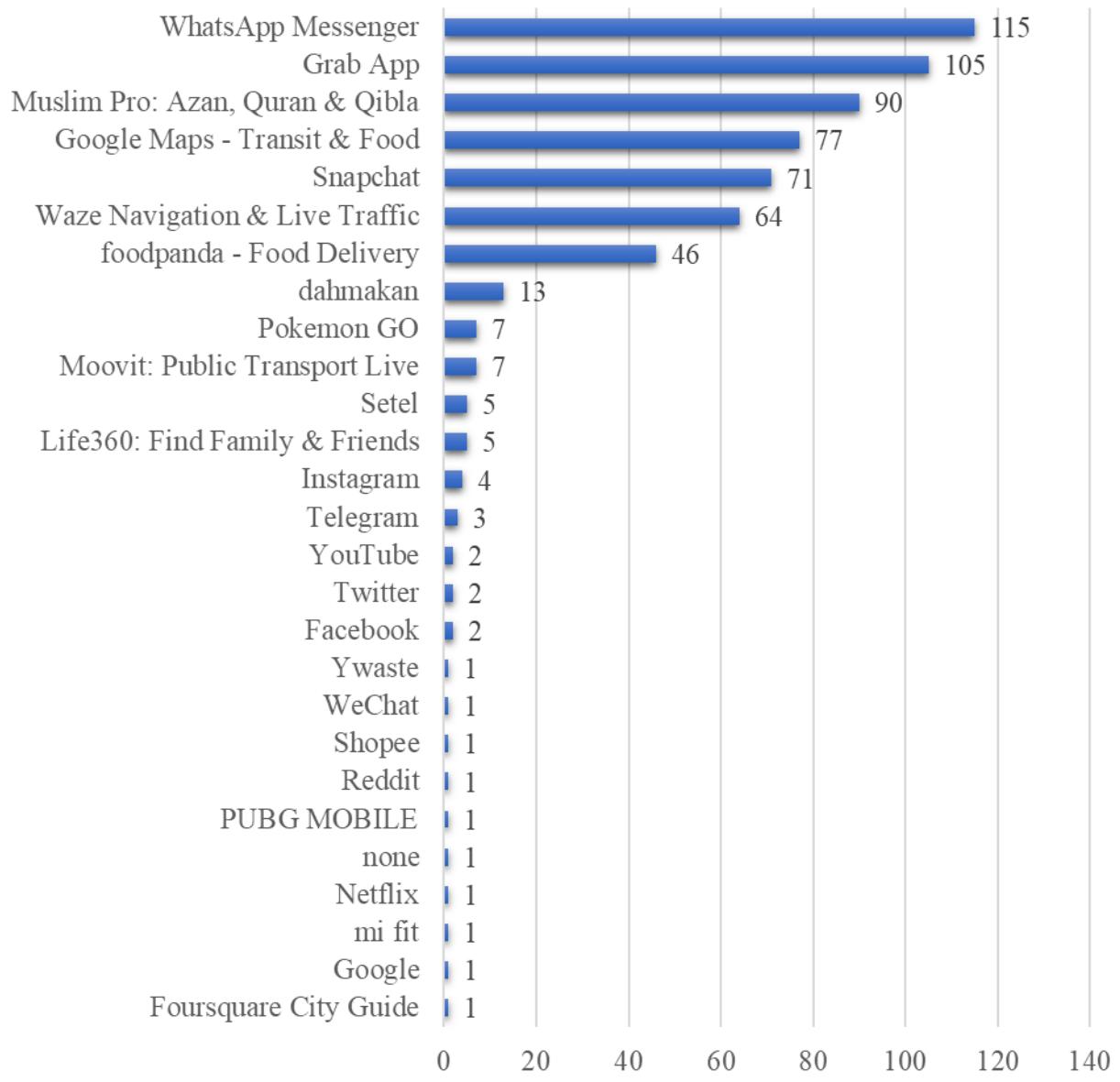


Are you studying any IT-related subjects at some point in your current university study? / Adakah anda sedang mengikuti subjek-subjek berkaitan IT pada waktu tertentu dalam pengajian yang anda sedang ikuti?

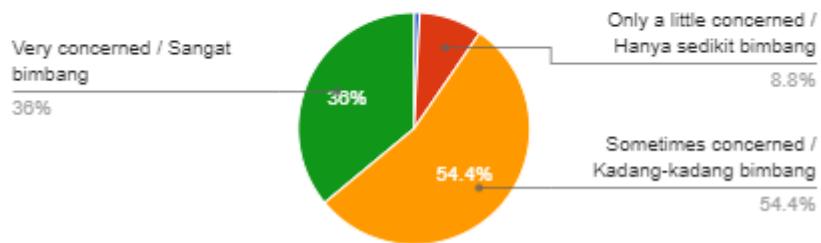




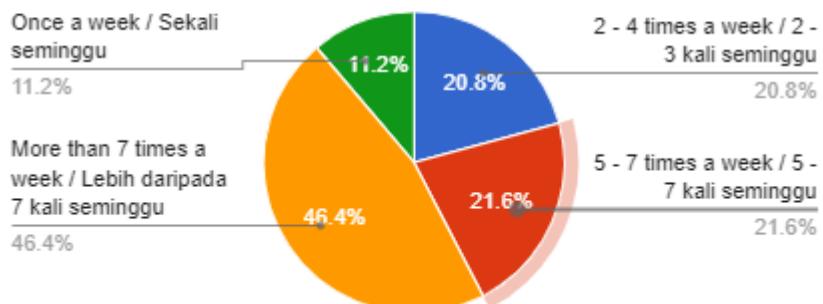
**Which five (5) mobile location-based service applications you most frequently use in your smartphone? / Apakah lima (5) aplikasi-aplikasi mudah alih berasaskan lokasi yang paling anda kerap gunakan dalam telefon pintar anda?**



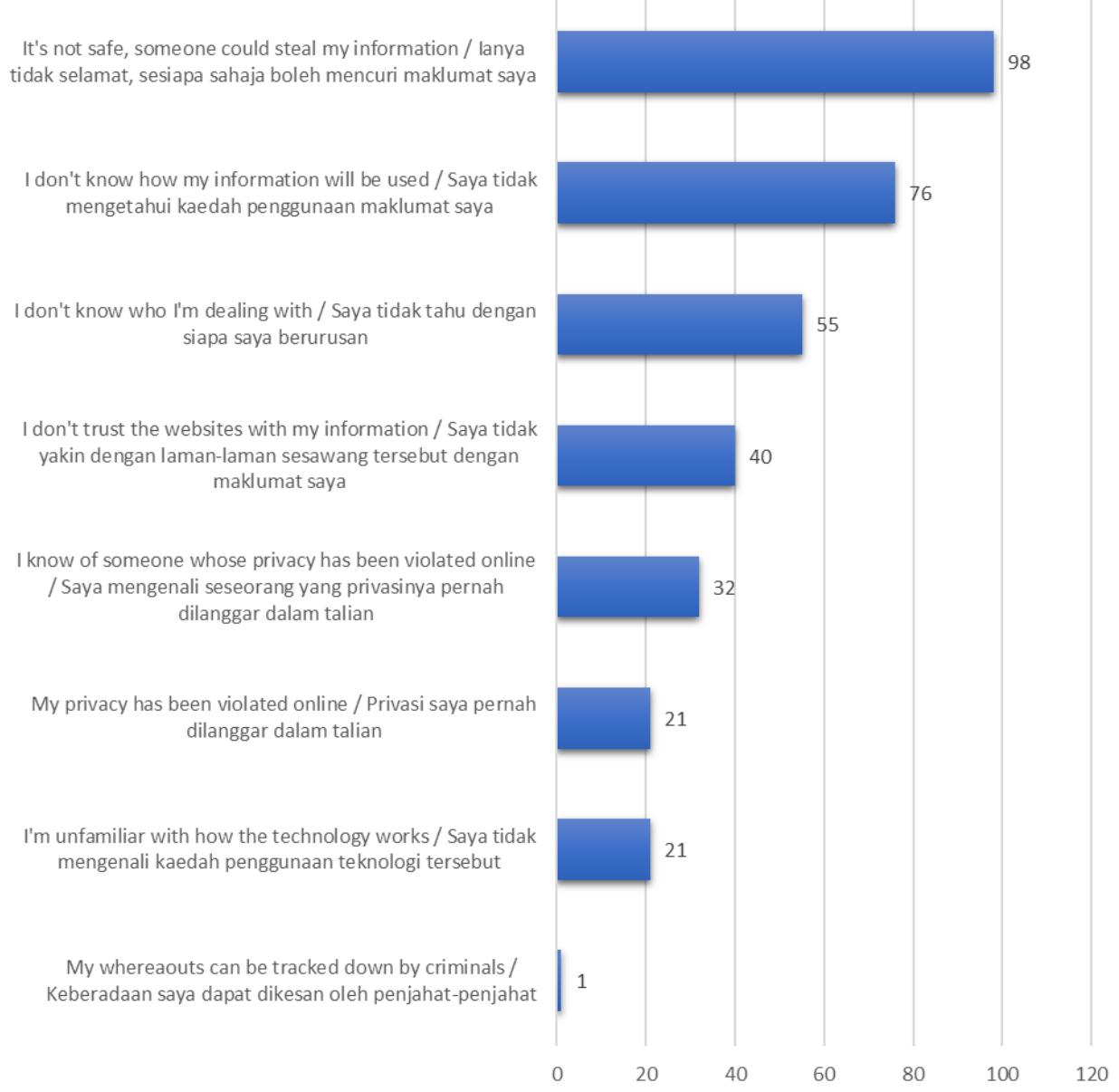
In general, how concerned are you about location data security on the Internet? (e.g people knowing your home address, finding out your current location etc.) / Secara umumnya, pada tahap manakah anda bimbang tentang perlindungan data lokasi dalam Internet? (Contohnya, orang lain mengetahui alamat rumah anda, mengetahui lokasi terkini anda dan sebagainya.)



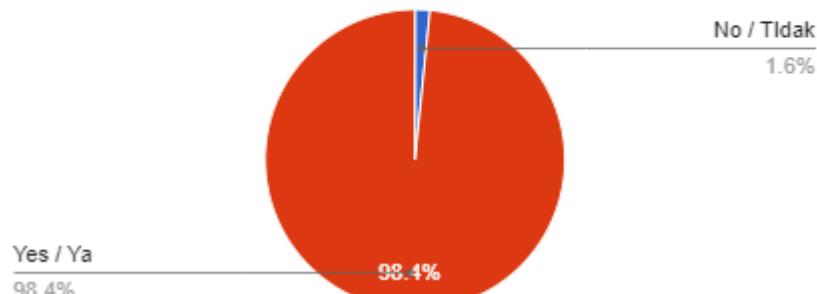
How often do you use these mobile location-based service applications in a week? / Dalam 30 hari terakhir ini, berapa kerapkah anda menggunakan aplikasi-aplikasi mudah alih berdasarkan lokasi ini dalam seminggu?



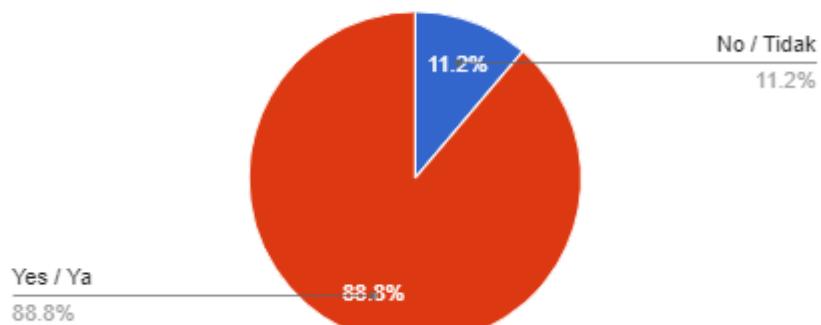
**In general, why are you concerned about your location data security on the Internet? / Secara umumnya, mengapakah anda berasa bimbang mengenai perlindungan data lokasi dalam Internet?**



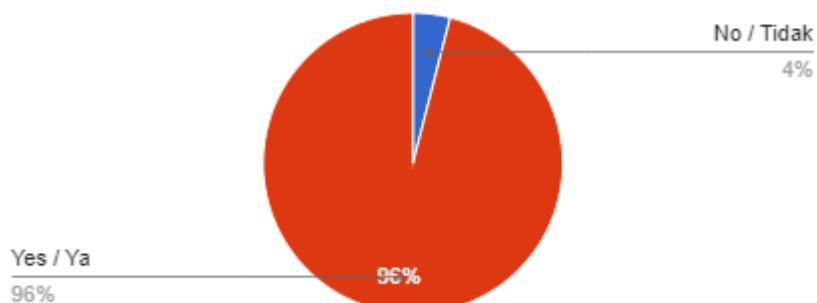
Are you aware that all location-based mobile applications require your permission to access your location data? / Adakah anda menyedari bahawa semua aplikasi mudah alih berdasarkan lokasi memerlukan kebenaran anda untuk mengakses data lokasi anda?



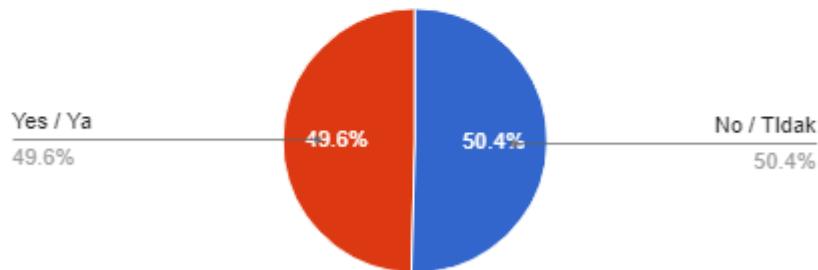
Are you aware that you can control your location settings in your smartphone? / Adakah anda menyedari bahawa anda boleh mengawal tetapan lokasi anda dalam telefon pintar anda?



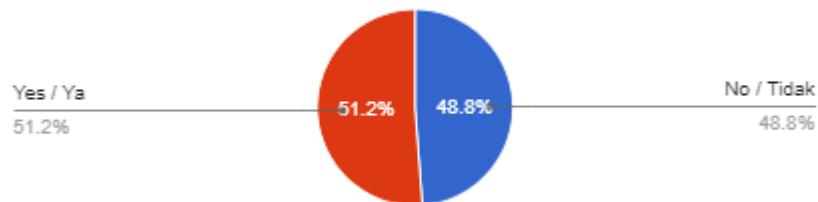
In your opinion, do you agree that your location data is personal or sensitive to unauthorized users? / Bagi pendapat anda, adakah anda bersetuju bahawa data lokasi anda adalah bersifat peribadi dan sensitif terhadap pengguna-pengguna tanpa izin?



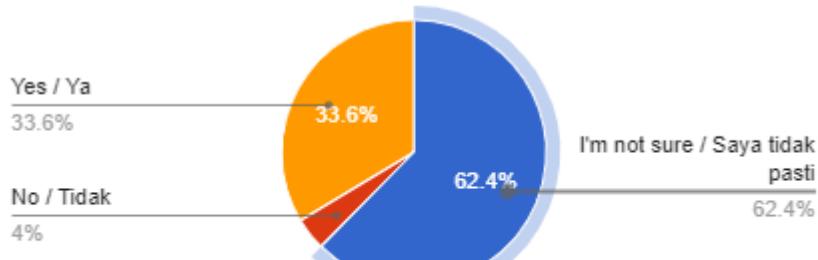
Are you aware that a number of location-based mobile applications can access your location data without your permission? / Adakah anda menyedari bahawa terdapat sebilangan aplikasi mudah alih berasaskan lokasi yang boleh mengakses data lokasi anda tanpa kebenaran anda?



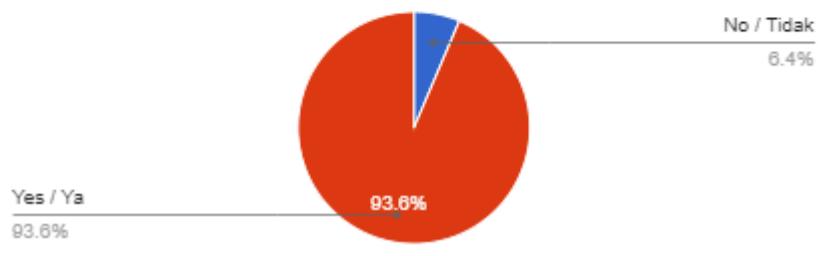
Are you aware that Malaysia has online privacy laws (e.g. The Personal Data Protection Act 2010) to safeguard the individual rights to privacy online before answering this survey? / Adakah anda menyedari bahawa Malaysia mempunyai undang-undang privasi dalam talian (cth. Akta Perlindungan Data Peribadi 2010) untuk menjaga hak privasi individu dalam talian sebelum anda menjawab tinjauan ini?



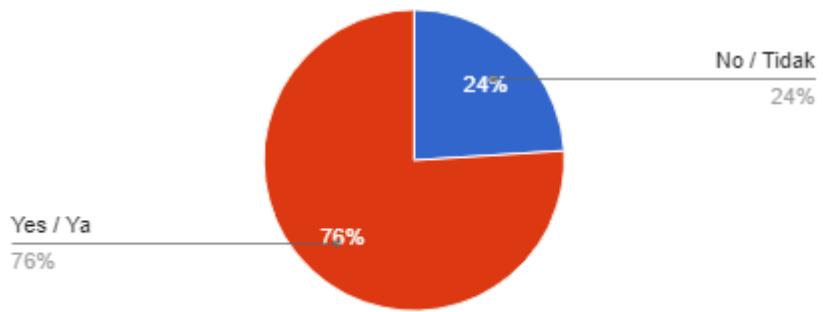
In your opinion, do you agree that these online privacy laws effectively safeguard the individual rights to online privacy in Malaysia? / Pada pendapat anda, adakah anda bersetuju bahawa undang-undang privasi dalam talian dapat menjaga hak privasi individu dalam talian secara berkesan?



In your opinion, do you agree if the Parliament of Malaysia decided to restrict more individual rights to privacy in paramount situations for the benefit of society? / Pada pendapat anda, adakah anda bersetuju sekiranya Parlimen Malaysia bertindak untuk mengehadkan lebih banyak hak privasi individu dalam situasi-situasi mustahak demi kebaikan masyarakat?

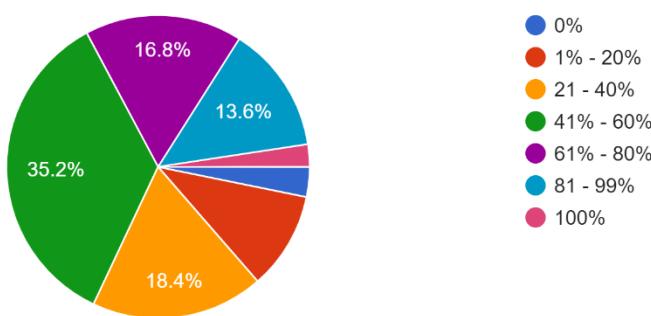


Have you been asked to provide location tracking data at location-based applications you visit? / Pernahkah anda diminta untuk memberikan data pengesahan lokasi pada aplikasi-aplikasi berdasarkan lokasi yang telah anda kunjungi?



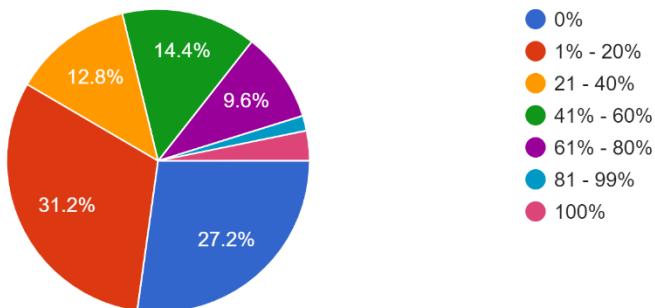
If asked to provide personal location data, what percentage of the time do you refuse to give the requested personal information? / Sekirany...lak kebenaran untuk memberi maklumat tersebut?

125 responses



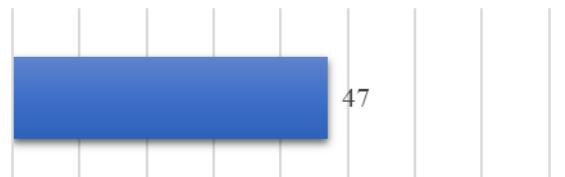
If asked to give personal location data, what percentage of the time do you actually read the privacy policy, if given? / Sekiranya diminta untuk memberikan lokasi pribadi, seberapa banyak waktu yang dibutuhkan untuk membaca kebijakan privasi?

125 responses



**If you have refused to disclose personal location data, what are the reasons of the said action? / Sekiranya anda menolak dalam pemberian data lokasi peribadi, apakah sebab-sebab yang mendorong anda untuk berlaku sedemikian?**

I am concerned my life is in danger if I give my location data / Anda bimbang kehidupan saya dalam keadaan bahaya sekiranya saya memberikan data lokasi saya.



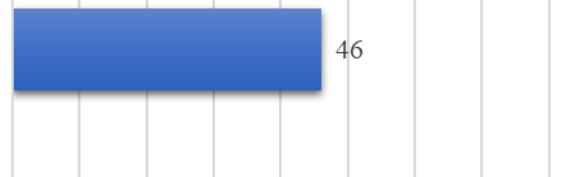
I am concerned I will receive junk mail if I give my home address / Saya bimbang saya akan menerima mel-mel remeh sekiranya saya memberikan alamat rumah saya.



I am concerned that the information will be intercepted or stolen / Saya bimbang bahawa maklumat yang saya berikan akan dipintas atau dicuri



They asked for particularly sensitive pieces of location information (e.g. home address etc.) / Mereka meminta maklumat-maklumat lokasi sensitif (cth. alamat rumah sbg.)



The value I will receive from the applications is not worth the information I give / Nilai yang saya terima daripada aplikasi-aplikasi tersebut apabila saya memberi maklumat tersebut adalah tidak berbaloi



I generally prefer to be anonymous in these applications/ Secara umumnya saya lebih suka menjadi pengguna tanpa nama



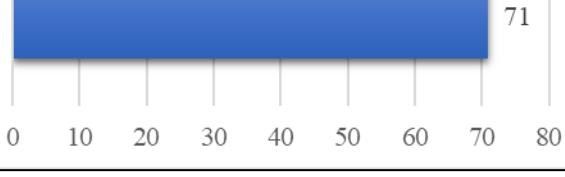
The applications do not disclose how they plan to use my information / Aplikasi-aplikasi tersebut tidak menjelaskan kaedah mereka untuk menggunakan maklumat saya



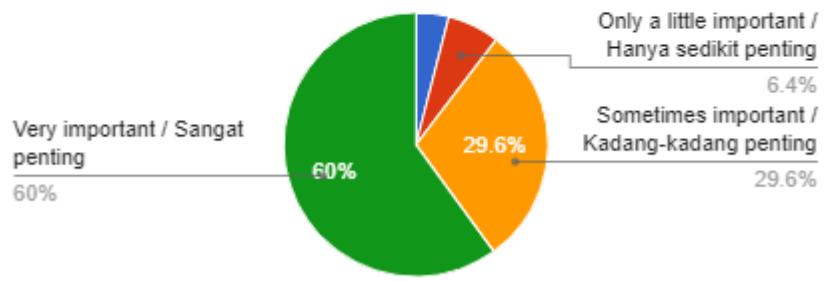
I don't trust the company/individual running the applications / Saya tidak yakin dengan individu/syarikat yang menguruskan aplikasi-aplikasi itu.



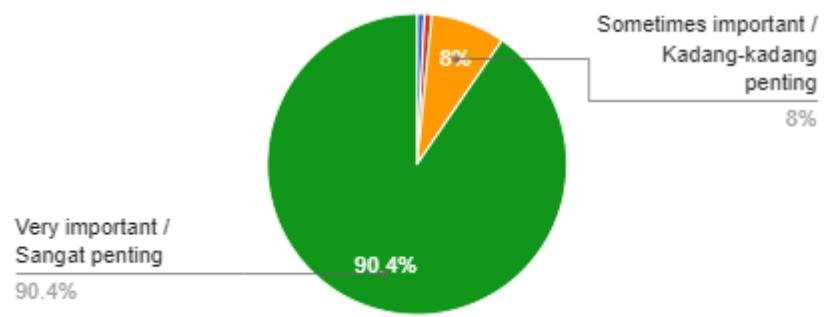
I am unfamiliar with the company/individual running the applications / Saya tidak mengenali individu/syarikat yang menjalankan aplikasi-aplikasi tersebut



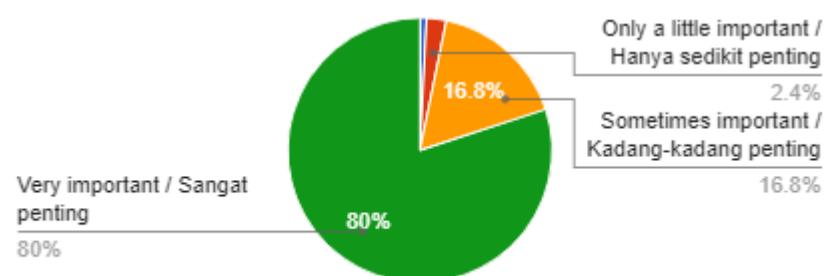
How important is the reputation of the company in your decision to your give personal location data through these location-based applications? / Pentingkah reputasi sesebuah syarikat dalam pilihan anda untuk memberikan data lokasi peribadi anda melalui aplikasi-aplikasi berdasarkan lokasi ini?



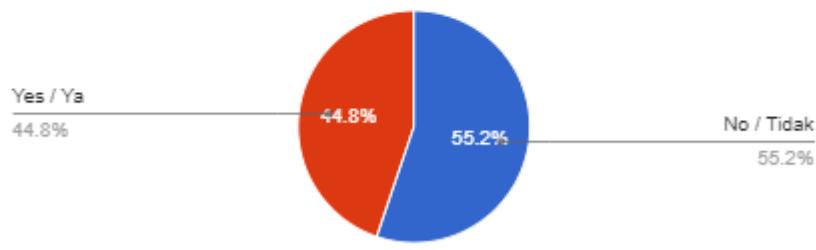
How important is your consent when location-based applications sell/share your location data with others? / Pentingkah kebenaran anda sekiranya aplikasi-aplikasi berdasarkan lokasi bertindak untuk menjual/berkongsi data lokasi anda kepada orang lain?



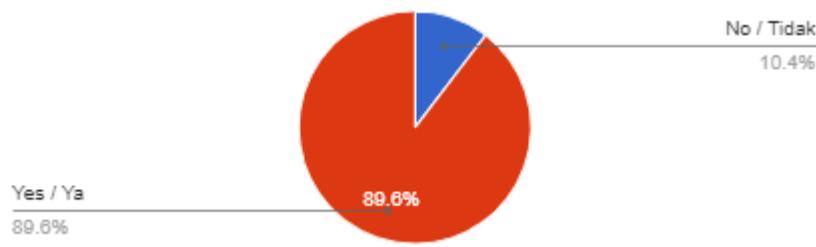
How important is your consent when location-based applications physically track you movement and location? / Pentingkah kebenaran anda sekiranya aplikasi-aplikasi berdasarkan lokasi bertindak untuk mengesan pergerakan dan lokasi anda secara fizikal?



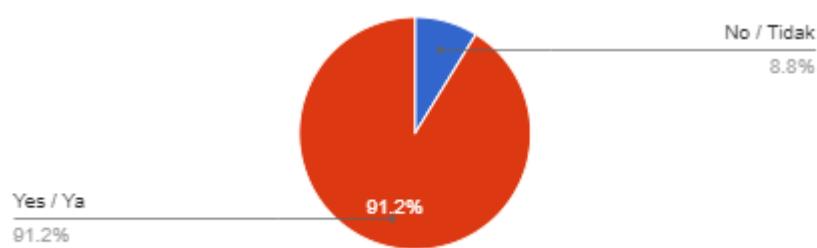
Do you consider location-based applications tracking your physical location WITH your knowledge to be a violation of your individual rights to privacy? / Adakah anda menganggap aplikasi-aplikasi berasaskan lokasi ini mengesan lokasi fizikal anda DENGAN pengetahuan anda sebagai pelanggaran hak privasi anda?



Do you consider location-based applications tracking your physical location WITHOUT your knowledge to be a violation of your individual rights to privacy? / Adakah anda menganggap aplikasi-aplikasi berasaskan lokasi ini mengesan lokasi fizikal anda TANPA pengetahuan anda sebagai pelanggaran hak privasi anda?



Do you agree if your location data is being compiled by these location-based applications in paramount situations WITH your permission? / Adakah anda bersetuju sekiranya data lokasi anda dikumpul oleh aplikasi-aplikasi berasaskan lokasi ini untuk situasi-situasi yang mustahak demi kebaikan masyarakat DENGAN kebenaran anda?



Do you agree if your location data is being compiled by these location-based applications in paramount situations for the benefit of society WITHOUT your permission? / Adakah anda bersetuju sekiranya data lokasi anda dikumpul oleh aplikasi-aplikasi berdasarkan lokasi ini untuk kes-kes yang mustahak demi kebaikan masyarakat TANPA kebenaran anda?

