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EXPERIENCING I-LULACAST URBAN PLANNING VIRTUAL SURVEY APPROACH DURING PANDEMIC COVID 19

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Abstract

The COVID 19 pandemic has led to an explosion of online research approaches, particularly on the virtual survey. This paper demonstrated the Land use and Landscape Character Survey Tool (i-LULACAST) as a virtual survey tool to collect the geospatial data for the royal land database in Pekan, Pahang. Two different types of frameworks have been developed based on user and expert-oriented. It was purposely to collect data consist of land use and landscapes aspects. The findings show that using a virtual survey can capture the database regarding the resident's profile and the current database of urban design images of the study area. This application is acceptable in the current situation, making the work easy and safer since data compilation is faster than conducting an on-the-ground survey. The impact of this project helps to standardise the coordination of the land management database and landscape profile in the study area. The most challenging part of this project is switching the manual approach into the digital approach, such a switching the manual into the digital approach, such as convincing the residents to provide their personal information through i-LULACAST. Our experience suggests that virtual surveys can effectively obtain high-quality data, result in time and cost savings, and contribute to lowering the CO2 footprint associated with field-based data collection. In conclusion, the project has proved the potential as a virtual survey tool as new norms in conducting the physical survey in urban planning, particularly during the Covid-19 pandemic.

Keywords: Virtual Survey; Land Use; Urban Planning; Pandemic; i-LULACAST

1.0 INTRODUCTION

The COVID 19 pandemic has led to an explosion of online research approaches. This crisis is affecting how we work remotely. It may also affect the way we go about conducting research. Many researchers are having to suspend data collection or re-design their projects taking into account social-distancing measures. The pressure to use online surveys in a short space of time may lead to another pandemic. A virtual survey is a method for collecting primary data that uses a computer with various levels of interviewer involvement. Web-based surveys, or e-surveys, are surveys designed and delivered using the internet. The use of these survey tools is becoming increasingly common in various fields of study (Joffre, et al., 2020; Lee et al., 2003; Maymone et al., 2018; de Boni, 2020). It is time and cost-efficient, reduces error during data transcription, enables multimedia elements, and contributes to lowering the carbon dioxide (CO2) footprint associated with travelling for field-based data collection. While the use of virtual surveys is not new, lockdowns in response to the coronavirus disease (COVID-19) outbreak have highlighted their potential as one of the most viable options for data collection for development initiatives (De Man et al., 2021).

Virtual surveys methods are helpful at any point in the project cycle to overcome distance and travel restrictions. These surveys can be used to conduct due diligence, including social and gender assessments, indigenous people's census and household surveys, public consultations, and technical due diligence. The advantages and disadvantages of a virtual survey as in Table 1:

Table 1. Advantages and Disadvantages of Virtual Survey Over Conventional

Advantages	Disadvantages
Recruitment and replacement of survey participants are efficient and effective.	With poor mobile network access, people without mobile phones or low digital literacy may be left out in virtual surveys leading to sampling bias.
Web-based control platforms enable immediate data export and real-time data availability as the survey is underway.	
On-the-spot data input increases data quality. For example, data gaps or vague statements can be identified and clarified immediately with respondents.	
Virtual surveys can capture location through a global positioning system (GPS), time stamps, and geographic information system (GIS)-integrated data.	It isn't easy to provide incentives for respondents, and this can reduce interest.
Virtual surveys allow for a system of records accessible and referenceable throughout the project life and enable data analytics for progress monitoring.	
They are cheaper, reduce or eliminate travel and extensive data entry costs, and can be conducted in less time than conventional ones.	Participants can incur costs for mobile or internet access charges when answering the survey or downloading survey forms or apps.
They also reduce CO2 emissions linked to travel and lessen the use of paper and printed materials	

The comparison above shows more advantages to using the virtual survey method than collecting data using a conventional method. A virtual survey allows for a more efficient and comprehensive distribution of survey questions over the whole research area. Furthermore, can obtain prompt replies from the targeted respondent.

2.0 VIRTUAL SURVEY & URBAN PLANNING

Since the development of surveys in urban planning published in 1962, there has been a shift from traditional survey methods (in-person interviews, telephone, and paper-based surveys) to Web-based surveys (Rossi-hansberg & Wright, 2007; Watts, 1962). Web-based surveys have the advantage of simultaneously storing data, thus bypassing data entry errors. In addition, web-based surveys allow for calculating response rate or view rates to understand the extent of distribution. The view rate is specific to Web-hosted surveys and is defined as the ratio of unique survey visitors divided by unique site visitors (Eysenbach, 2004).

Land use surveys show you the use of each piece of land and each building in the city or rural areas. There are different kinds of user surveys, but we shall only be concerned with urban surveys. We must obtain our information for such surveys by what we call a field survey - that is, we must walk around the town and make notes of the different types of use that we see. Then, when we get back into our drawing office, we must record the information to use it for further work - that is, we must map it.

The implementation of survey methods during data collection is closely related to the urban planning sector. It will often involve collecting the socio-economic data of the population before planning development in a study area. This will require many enumerators to conduct a field-based data collection like face-to-face surveys or from house to house to ensure that each resident in the study area cooperates in completing the required data. This method was inefficient at this time of pandemic as we had to apply new norms in each study that rely on the virtual survey (Bădiță & Popescu, 2012; Joffre et al., 2020; Long, 2012).

Moreover, the changes in the data collection methods were utilised, particularly in collecting data on household surveys and the social behaviour of a place (Bidarbakhtnia, 2020). Besides, implementing the virtual survey during this pandemic has resulted in the optimisation on the quality of the data obtained (Leigh et al., 2020; Boutebal, et al., 2021). Therefore, this study attempt to demonstrate the virtual survey done in sultanate land at Pekan, Pahang. The virtual survey developed, the Land Use and Landscape Character Survey Tool (i-LULACAST), focuses on the land use section, involving the social database and landscape characteristics section, that involve the physical and cultural database of the study area. The surveys are carried out remotely with the assistance of the chief village and the involvement of several JKKK representatives from each village via the distribution of the i-LULACAST link and QR code through social media and the distribution of pamphlets to each house.

3.0 STUDY AREA

Virtual survey i-LULACAST was demonstrated in the developing sultanate land database in Pekan Pahang. The i-LULACAST is a web-based virtual survey developed for collecting data, particularly on an area's land use and landscape character. The development of i-LULACAST is an initiative to restrict site survey activities by the Malaysian Government to avoid face-to-face data collection and reduce physical contact during the data collection period. Therefore, the data collection is carried out through virtual data collection apps and crowdsourcing i-LULACAST. The i-LULACAST has been used in the data collection stage to develop Sultanate land databases in Pekan, Pahang.

Fig. 1. The study area location for implementation of i-LULACAST

Figure 1 above shows the study area plan that consists of the whole area of Sultanate Land with the boundary of six villages; Kg Mengkasar, Kg Padang Buluh, Kg Pekan Lama, Kg Parit Engku Dato', Kg Padang Polo and Kg Permatang Pauh.

4.0 MATERIAL AND METHODS

March 2019 has marked the beginning of the spread of the Covid-19 virus in Malaysia. It has affected not only the country's economic aspect but also the social and environmental aspects. For urban planning, many stakeholders involved in the site investigation and the potential crowdsourcing have been affected by this pandemic. Therefore, developing the virtual survey web application (i-LULACAST) is the best option during a pandemic. Developing a virtual survey comprises the data gathering required by the client and designing the online questionnaire survey to disseminate to the respondents, further analysing the recorded data.

In January 2020, we were conducting the social and population assessment of the residents who resided in sultanate land in the study area. We had started by completing focus group discussions (FGDs) with stakeholders and planned to follow up with a survey in February. However, the COVID-19 pandemic forced us to change plans and to instead carry out a virtual survey through a platform of i-LULACAST. Our first step was to prepare questionnaires for a specific group of respondents, test the questionnaires, and generate QR codes to make them easily accessible.

Method

The researchers and enumerators were not able to conduct fieldwork due to movement restrictions by the Government. Therefore, with the assistance from liaison officers from the High Royal Highness (HRH) Sultan Pahang office and the representative from each village, we managed to distribute the questionnaires to all the houses in the study areas by sending the link and Quick Responds (QR) codes media. Another initiative made is by disseminating the brochures and pamphlets to every house in the study area. Therefore, this method will expand the outreach to the villagers that do not have a device. The flow of process in designing i-LULACAST for GIS land development are as follow:

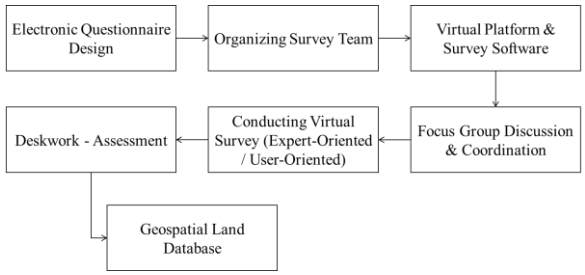

Fig. 2. The flow of general methodology involved in designing and implementing i-LULACAST

The flow of the general methodology shown above is detailed into three main stages, as in Fig. 3 to get the results of the databases from the i-LULACAST approach.

First Stage. The first stages involve the preliminary and literature study of the case studies comprising the project's objectives and background studies. Then, the virtual survey questionnaire then developed in this stage by identifying the target groups of respondents, the sample sizes, and the strategies considering several ways to reach out to those who lack internet or mobile connectivity or who have limited digital literacy.

Second Stage. The data collection stage. Several methods were used in this project other than a virtual survey through observation and inventory, drone technology and GIS, and interview sessions with the targeted group. The virtual survey was developed with two types of frameworks, user-oriented and expert-oriented. The user-oriented focus is on the resident's profile involving all the residents of the Pekan Sultanate Land.

Meanwhile, *"Expert-oriented"* involves a few experts focusing on the landscape characteristics of the Malay royal towns. The simple outline of the questionnaire is created and tested before being used in the study area. For a user-oriented approach, besides preparing the manual on completing the i-LULACAST, several facilitators are trained in the field on how to fill in the i-LULACAST for people who have difficulties in completing the form. Also, several enumerators were appointed to focus on filling in the landscape characteristics data with the experts.

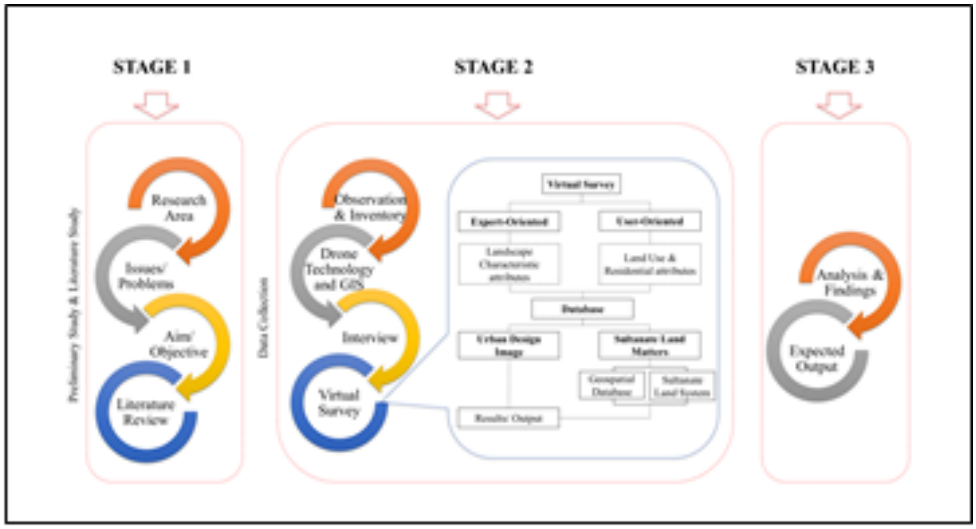

Fig. 3. Stages in implementing i-LULACAST during data collection

The respondents are given a period to complete the survey. The data collection period is conducted in four phases due to the responses of the data collected. In addition, the progress of i-LULACAST records is monitored from time to time to make sure all the resident's profile in the study area is recorded in i-LULACAST. Besides, the research team work closely with the chief village to obtain feedback and responses from the residents to ensure the confidentiality and accuracy of the data.

Third Stage. The data analysis and finding stage. Two types of databases have been collected in i-LULACAST. One is on the urban design image of the Pekan Royal Town, and another one is the geospatial database for the Pekan Sultanate Land. The results from the databases have been analysed with several types of analysis, including cross-analysis and others.

5.0 RESULT AND DISCUSSION

i-LULACAST is a virtual web-based survey tool. The application was developed to support data collection via survey with security features (https, cloud server, admin roles and password controls). It consists of two categories of surveys that further can be exported to Excel format.

Assessing on Output

User-Oriented. Various platforms are used to informed the villagers to fill in the data using i-LULACAST, including through the dissemination by virtually and physically. The village representative was used WhatsApp and Facebook to disseminate pamphlets and information.

Four phases of data collection for this framework is carried out from 26th February 2021 Until 31st May 2021. Phase 1 is carried out remotely for two weeks, and then the i-LULACAST system was closed for three villages as the numbers of records of the respondents who fill in the i-LULACAST have reached the total number of houses in the village. Finally, phase 2 is carried out to the other three villages that are yet to achieved the total number of houses in their village. The duration of Phase 2 is around three weeks.

However, the results from Phase 2 shows that two villages did not reach the target of half of the number of houses in the village recorded in i-LULACAST. Therefore, due to movement constraints by the representatives from each village, the third phase of this study was carried out based on two methods. The first method is conducting a one-stop centre data collection involving two villages and verifying data recorded in i-LULACAST with the chief village for other villages. The verification data involves the chief villages and the JKKK members. Then, the final Phase 4 is then done for any other villagers who did not have the opportunity to fill the i-LULACAST during Phase 1 to Phase 3 remotely.

Table 2. Data Collection Phases for User-Oriented Virtual Survey

Phase	Duration	Involvement
1	26/2 – 12/3/2021	All villagers in Kg Mengkasar, Kg Padang Buluh, Kg Pekan Lama, Kg Parit Engku Dato', Kg Padang Polo & Kg Permatang Pauh
2	13/3 – 4/4/2021	All villagers in Kg Mengkasar, Kg Pekan Lama, & Kg Permatang Pauh
3	5/4 – 9/4/2021	All villagers in Kg Pekan Lama & Kg Permatang Pauh JKKK Kg Mengkasar, Kg Padang Buluh, Kg Parit Engku Dato', & Kg Padang Polo
4	10/4 – 6/5/2021	All villagers

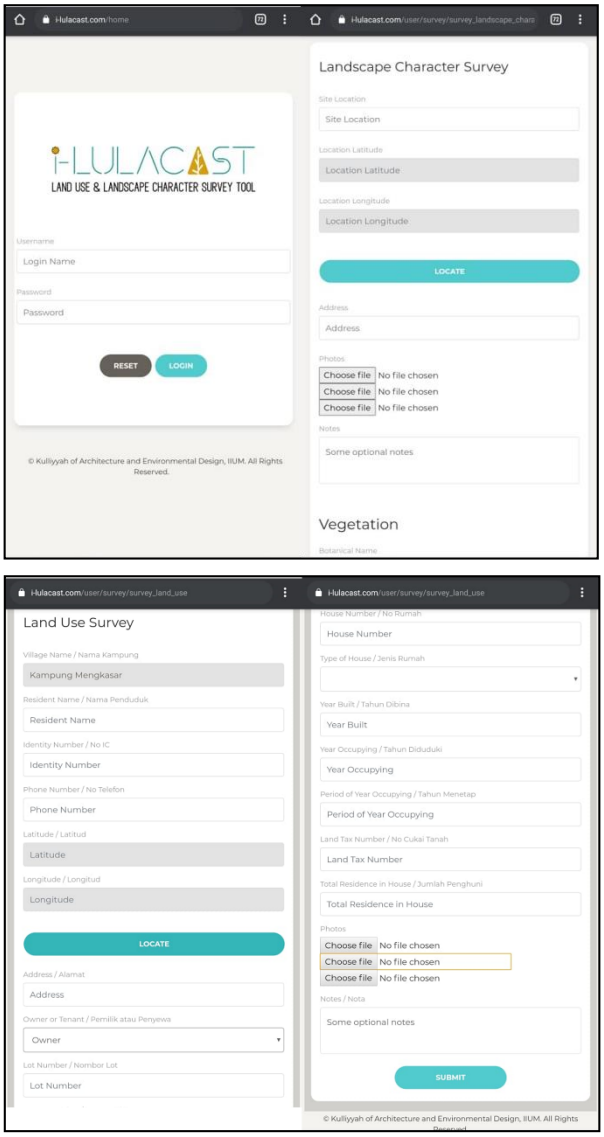

Fig. 4. Interface for i-LULACAST (link can be accessed - https://i-lulacast.com/)

Constraints of movement and the movement of the study period make the selection of the use of this application timely. The work done is more focused on disseminating application links and then providing training to the village head and other JKKK members. The villagers have also been given the link to the application, and they can fill in the data themselves from their homes.

Figure 5 shows that the performance of the i-LULACAST survey that was successfully conducted in the study area. Over 60% out of 1754 respondents participated in the i-LULACAST survey for the first phase of launching. The respondent rate considered is high, with 60% completing the survey. The quality of responses was also increased. We noticed that using a mobile app had created a closer engagement from respondents than is usually the case with paper-based questionnaires—the number of data recorded in i-LULACAST according to four phases of data collection. The number of recorded data shows the high rate of retrieval data from all villages in phase one. Only three villages did not achieve the total number of houses in the respective village during Phase 1.

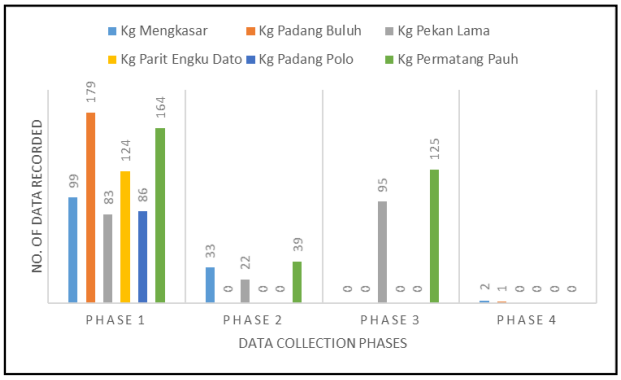

Fig. 5. The number of data recorded according to phase (retrieved from i-LULACAST system)

Thus, continue the virtual survey until Phase 4. Meanwhile, Figure 6 shows one of the examples of location data retrieved from i-LULACAST application.

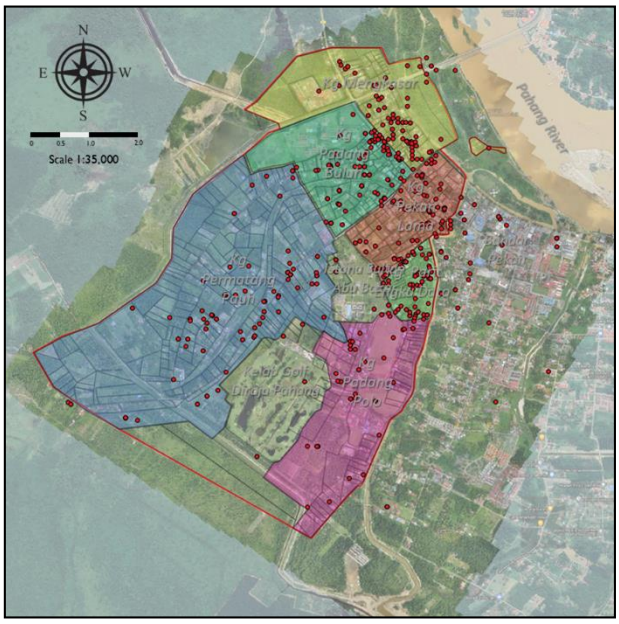

Fig. 6. The example of mapping output location that retrieved from i-LULACAST system

Expert-Oriented. Five main character appraisal inventory is emphasised in the i-LULACAST assessment, including the 1) regional character, 2) local character, 3) morphology, 4) linkages and streetscape, and 5) uses and activities. The findings resulting from this framework is summarised in Table 1 below.

Table 3. Character Appraisal Inventory

Component	Assessment Criteria
Regional Character	• Overall view • Patterns of development according to history • Location of palaces • Placement patterns • Natural environment
Local Character	• Royal Town Components • Palace location and architectural design • Local history • Cultural characters (motives) • Variety and uniformity of colours, textures, facades and building materials used • Ethno landscape (according to local cultural practices)
Morphology	• Patterns of development according to history • Placement patterns
Linkages & Streetscape	• Street Network • Legibility • Landscape design and arrangement • Scenery quality • Street Components
Uses & Activities	• Activity node • Arts and culture • Recreation • Traditional food • Seasonal formal and informal events • Open spaces and public spaces

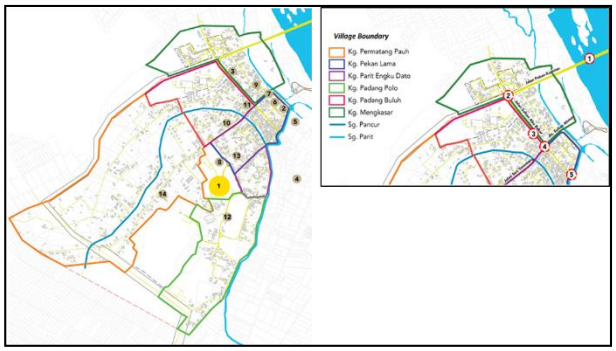

Fig. 7. Mapping of the Palaces and main entrances towards Pekan Royal Town through i-LULACAST

The assessment that has been made through i-LULACAST has made it easier for the researchers to analyse as the findings were systematically arranged through the data collection. The strength of the analysis shows that there are several elements and motives of Malay characteristics. However, there is no uniformity in the designs of the motives and elements. The landscape design does not exhibit beautiful scenery and atmosphere as there are limited spaces on the road, shoulder and median. Therefore, it is an opportunity to enhance and beautify certain landscape aspects in the study area.

The advantage of the i-LULACAST is more efficient and effective. The Web-based control platforms enable immediate data export, and real-time data availability as the survey is underway. At the same time, data gaps or vague statements also can be identified and clarified immediately with respondents. These virtual surveys can capture location through a global positioning system (GPS), time stamps, and process further in geographic information system (GIS)-integrated data. Virtual surveys allow for a system of records accessible and referenceable throughout the project life and enable data analytics for progress monitoring. In addition, they are cheaper, reduce and minimise travel and extensive data entry costs, and proof be conducted in less time than conventional ones.

6.0 CONCLUSION

In conclusion, respondents' lack of in-person movement and timeliness during a pandemic push researcher to develop the online survey. The i-LULACAST is the Web-based surveys are practical and invaluable resources for researchers and urban planning. They are rapid and convenient, allowing efficient and often cost-effective data collection. While using these methods can be particularly useful during the current pandemic. The usage of the virtual web-based survey helps researchers ensure the progress of study can be conducted, particularly during pandemic Covid-19.

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