Implementation of gamification concept in the health complaint service system to improve the public health services system of Banyuwangi for supporting the health Indonesia program through a family approach

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Abstract:  
Gamification introduces game design elements into non game application by using competition, points, achievements, rules of play, status to encourage action through positive feedback such as motivating participation and loyalty. Now the Ministry of Health establishes an operational strategy through family approach to increase health services access in each unit. Banyuwangi support this program. The program’s name is “pick up the ball, care for residents” for serving public health. This program requires the cooperation of citizens. Designing citizen interaction in providing information to health workers in improving the efficiency of work of officers visiting people can be built through a public health complaint service system. Designing business processes using gamification and adopting a family approach to the flow of the public health complaints service process. This research didn’t use statistical analysis but development design business process. The gamification concept implemented easily so increase interaction, participation, motivation and enthusiasm of users using the system so users actively provide respond because this concept is complemented by the challenge and reward through giving of point from collected activities by adopting a family approach can facilitate posyandu cadres in their duties because every family member helping posyandu cadres in controlling the health of family. Design of business process using a combination of gamification concepts and family approach can make it easier to draw up a Health Complaint Service System design so that it can support The Health Indonesia Program through a family Approach.

Keywords: Ministry of health, designing gamification, service healthy system.

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Introduction

The ASEAN Smart Cities Network (ASCN) is a collaboration between countries in ASEAN initiated by Singapore at the 2018 ASEAN Summit to realize smart and sustainable urban development to improve the quality of life for ASEAN citizens through technological empowerment (1). Indonesia as one of the ASEAN Member States (AMS) designates three cities that have become ASCN’s smart city pilot projects for Indonesia, namely DKI [Daerah Khusus Ibukota (Capital Spesial Region)] Jakarta, Makassar, and Banyuwangi. Smart city development covers many sectors such as transportation, water quality, energy, health care, education, public services, data, and information and communication technology (ICT). Banyuwangi, as one of the Smart City pilot projects in Indonesia, requires a study to analyze the achievements of the Banyuwangi District Government in terms of ICT-based public services. The study of ICT–based public service achievements of the Banyuwangi District Government was used in order to reach the ASEAN Smart Cities Network.

Many health programs in Banyuwangi, one of which is the “pick up the ball, take care of residents” program to serve the community, so that residents do not need to come to the Puskesmas or hospital, because health workers come to the resident’s home. This program requires citizen cooperation for optimally working because it requires interaction with residents to find out the condition of the sick people. The problem of this healthy Banyuwangi program is requiring the active participation of representatives from the health office visiting residents and residents of Banyuwangi to provide information. The contours of the villages that are hilly and broad in the countryside are obstacles so that visits to residents are slow. When there are sick people they have to wait for the
scheduled visit. one of the ways solving this problem is complaints system. The results of the survey and interviews with the Head of Information Technology, the Banyuwangi Regency Communication, Information and Encoding Department conducted by our research group "MSI group" using Sistem Pemerintahan Berbasis Elektronik (SPBE) - Electronic Based Government System instrument evaluation found that institutional aspects of the integrated business process innovation and public complaints services indicators are at level three scale of five scale. The meaning is good, but the public complaints services are not specific. All complaint services become one, it is very difficult to classify, so the affects are slow responds. This problem can be solving with reengineering business process. Business process is a collection of activities or structured work that is interrelated to solve a particular problem or that produces a product or service (in order to achieve certain goals) (2). Using Business Process Reengineering can increase efficiency and effectively of system” (3). Healthy Indonesia Program for business process of this banyuwangi healthy program. The Healthy Indonesia Program is implemented by utilizing all the potential that exists. The Healthy Indonesia Program starts from the smallest unit of society (family) and focuses on the mother to know the health conditions in each family. The implementation of Healthy Indonesia Program in healthy Banyuwangi program can be increase the access range, the speed and accuracy of the response of health services (4). Citizen interaction in providing information to health workers in improving the efficiency of work of officers visiting sick people can be built through an information system that is a public health complaint service system. In the development of a public health complaint service system adopting a family approach in developing the business process of the system. The gamification concept is implemented this public health complaint service system to increase interaction, participation, motivation and enthusiasm of users to use the system so that users actively provide information and respond because this concept is complemented by the challenge and reward through giving of point from collected activities, such as giving information and providing responses about sick people, etc. gamification concept is implemented this public health complaint service system because in principle gamification has the ability to increase retention, attention and interaction between users and applications or systems. The gamification component that will be applied in this design consists of four pieces, namely (5):

i. Rules: Is an order that is used as a basis in a game, usually this rule is used to explain what can be done and not done by the user

ii. Feedback: Reciprocity in the form of rewards obtained by users when they have reached or completed something. Feedback is usually associated with gifts and points, or comments from users

iii. Goal: is the main thing that must be achieved by the user, and the goal can only be defined as two multiple and the single is only different from the amount that must be achieved, usually when the user reaches the goal a game is declared ended

iv. Challenge: it is a challenge to test the user's proficiency level and become an important component in game formation.

Based on these components, the Health Complaint Service System application was formed by using the achievement gamification approach, by giving points to active application users, which often share information, comment or provide feedback on posts or questions from other users and post various related things. The general objective of this research is to design a business process system to support the government program Banyuwangi "pick up the ball, take care of citizens" through a family approach, the next step was developed a web-based application The Health Complaint Service System. This application is used as a forum for users to share information, support information and respond to information, especially information related to poor people who are sick. The goals to be achieved in developing this application include:

i. Provides active, interactive and persuasive communication between users. Users of this application are residents of Banyuwangi, health workers from the puskesmas, member of Posyandu—Pos Pelayanan Terpadu (Integrated Service Post), community leaders

ii. Providing innovative information for citizens about health, especially related to nutrition

iii. Improve the response of health workers in serving citizens

iv. Provide additional information for the government so that it can assist in making decisions to serve the people of Banyuwangi

Analyze the achievements of the Banyuwangi District Government in terms of ICT-based public services. The study of ICT-based public service achievements of the Banyuwangi District Government was used in order to reach the ASEAN Smart Cities Network.
Materials and methods
This study has many steps as described in figure 1.

![Research diagram](https://doi.org/10.36295/ASRO.2020.2385)

**Figure 1**: Research diagram

The first step is collecting data. This step consists of study literature and interview. The literature used is a journal that relates to the problems of other researchers about business process, gamification concept, the Indonesian Health Program guidebook from the Indonesian Ministry of Health for finding the best method for solving the problem, and document of the result from Banyuwangi public services evaluation with SPBE instrument who was researched by members of msi group only as input material for describing situation analysis Banyuwangi healthy service program in this paper. analysis evaluation Banyuwangi public services with SPBE instrument is discussed in another paper (6). Interview is used for describing situation and needs analysis, in this paper interviewing the Head of Department, Information Technology, Banyuwangi Regency Office of Communication, Information and Coding. The second step designing the business process using the bizagi tool. The program that will be designed is picking up the ball, caring for resident programs by implementing a family approach in accordance with Indonesian health ministry regulations. The family approach is one of the ways the Puskesmas can increase the reach of the target and bring them closer to / improve access to health services in their working area by visiting families. Family as a focus in the approach to implementing the Healthy Indonesia program (7). What is meant by one family is a core family unit (father, mother and child) as stated in the Family Card. If in one household there are grandparents or grandmothers or other individuals, then the household is considered to consist of more than one family. The communication forum developed was in contact with the family so as to facilitate the implementation of the program by involving health cadres, such as Posyandu – Pos Pelayanan Terpadu (Integrated Service Post) cadres, Posbindu – Pos Pembinaan Terpadu (Integrated Development Post) cadres, Poskrest – Pos Kesehatan Pesantren (Pesantren Health Posts) cadres, PKK – Pemberdayaan Kesehatan Keluarga (Empowerment of Family Health) cadres, and others. Administrators of local community organizations, such as PKK – Pemberdayaan Kesehatan Keluarga (Empowerment of Family Health) administrators, Karang Taruna (Youth Organization) administrators, Pengajian (Rectation) managers, and others (8). To improve the speed and accuracy of the work targets of Banyuwangi's public health service program, an integrated communication forum was developed between the elements involved in accordance with the Indonesian Health Program guidelines through a family approach by developing a public health service complaint system application in real time. The

third step is designing and making application with waterfall model. This step starts from the need’s analysis. in business processes that have been built using a family approach can be concluded to obtain functional and non-functional requirements of the system. Designing application depend on business process. After that implementation gamification concept in coding system. Gamification is the use of game elements and game design techniques in nongame contexts, such as health, education, politics, the public sector, and business (9). In principle gamification can increase retention, attention and interaction between users and applications or systems. The gamification component that will be applied in this design consists of four pieces, as described in the following figure 2.

![Gamification Design on Application](image)

**Figure 2:** Describing gamification components

Based on these components, this application was formed by using the achievement gamification approach, by giving points to users of application that are active, which often share information, comment or provide feedback on posts or questions or complaints and reports from other users and post various things related to public health., as described in the following figure 3.

![Gamification Design on Application](image)

**Figure 3:** Describing basic gamification elements

**Results**

**Business process:**

Business processes of the Banyuwangi healthy program (“pick up the ball, take care of residents”) that have been built using a family approach. The family approach focuses on the family, especially the mother because the mother plays a major role in caring for family members. The family approach requires good cooperation between
health workers and community representatives drawn from existing organizations in the community to coordinate every family in the village, so that the users involved in the system can be identified as mothers, health cadres, such as Posyandu cadres, cadre of Puskesmas, PKK cadre, Management of local community organizations, such as PKK administrators, Karang Taruna administrators, pengajian managers, and others. This Banyuwangi program has many activities. The main activity is visiting every family in village for knowing the health of the community there then if there are sick people, they can be handled immediately without going to a hospital or health center so that residents are dealt with quickly and appropriately. Many people and organizations in the village are involved there. This paper explains all the activities contained in the program using the bizagi tool for business process modeling, as shown in figure 4. The activity starts from delegation of health workers of the health office coordinated with each other and then scheduled visits to each family. At the time of the visit the health worker conducted a health check of all family members met. If there is someone sick, they will do treatment directly in the homes of residents. if he cannot be treated from home, health worker recommends to the nearest hospital or health center. Sometimes a person waits for further treatment from a health worker, but they do not know the schedule and when health workers come, they are not at home, so treatment is stopped or not continued. The results of the visit will be reported to the Banyuwangi Health Office.

![Figure 4: Before implementation app](image)

In figure 4 shown that all activities have four times waiting time to do the next activity, such as when there are sick people or residents who want to do health treatment must wait for the schedule of visits of health workers to come to their homes. Information on the schedule of visits by health workers is also difficult to obtain by residents, so sometimes when visiting, residents are not at home, so it is not optimal. The implementation of this program involves personnel from various elements and organizations in the community as partners. many village health organizations were involved regional health department, hospital, puskesmas, posyandu village officials. They collaboration to be delegation of health workers for this program. The delegations visit every family as shown in figure 5.

In figure 5 shown that all activities have two times waiting time to do the next activity. The activity starts from delegation of health workers of the health office coordinated with each other and then scheduled visits to each family. delegation of health workers posting schedule in application so all of user know about their schedule. Information on the schedule of visits by health workers is easy to obtain by residents from healt worker posting, so sometimes when they visit, residents are already for checking at home, so it is optimal. At the time of the visit the health worker conducted a health check of all family members met. If there is someone sick, they will do treatment directly in the homes of residents. if he cannot be treated from home, health worker recommends to the nearest hospital or health center. Sometimes a person waits for further treatment from a health worker. They know
the schedule and when health workers come, they are already at home, so treatment is continued. The results of the visit will be reported to the Banyuwangi Health Office. The application makes the banyuwangi health program optimal through information flow becomes fast and smooth.

Figure 5: After implementation app

Gamification concept:

Representation of gamification design on app based gamification framework

There are several important steps in the gamification concept. In this paper uses six steps by K. Werbach and D. Hunter (9):

i Determine business goals (Define business objectives). Why do you apply gamifying? The implementation of gamification is used to increase retention, attention and interaction between users and applications or systems so as to motivate users to provide their health information directly, accelerating coordination with health workers. This increase is needed to improve optimization of Banyuwangi health programs through the ease of accessing information related to village health in real time from all parties involved.

ii Describe behavioral goals (Delineate target behaviors). Representatives from family members in the community provide information if one of the members is sick then the health staff immediately visits to carry out treatment without having to come to the hospital or puskesmas. Health workers provide information regarding the schedule of visits to the community so that each family in the area prepares because within a certain period health worker visit each family to carry out health checks. Health workers can in real time provide information on activities they do such as visiting schedules, provide health information easily and so on through the application. Citizens and health workers who often interact through the application will receive reward from activity points as an appreciation of activities carried out by the health department. The health office can easily monitor the activities of residents and health workers so that in helping on target.

iii Explain who the players are (Describe your players). Players in this system are representatives of families in the Banyuwangi area, representatives of the Banyuwangi Health Department, organizations in the village, health workers.

iv Designing repetition activities (devise your activity loops). One family member was sick, and the other members provided information through posting to the application and posting information from the residents was read and responded by health workers then the response of health workers, these residents became the first priority of the visit compared to other residents. People who are sick do not need to wait for a schedule.
of visits from health workers. Health workers make posts, namely the health reports of residents who are visited and the health office can respond with data to be classified and a recommendation to determine suitable health facilities and infrastructure.

Do not forget to be fun (Don’t Forget the Fun). The implementation of gamification is very necessary to facilitate and be able to increase motivation for each user. The unique geographical characteristics of the village, one of them is the steep terrain, the population density and the area of the village, causing health workers to be biased every day to visit, so scheduling is needed. Feedback from this implementation is that citizens can directly provide information on sick members in each family member without waiting for the visit. Health personnel and related health offices can monitor and classify each village with the health conditions of the residents so that the treatment provided is on target. The creation of improved health through a smooth flow of information.

Determine the use of the right tool (Deploy the appropriate tools). Gamification systems must be able to run on computers, mobile devices, or several other platforms so as to facilitate the operational activities of each user.

In principle gamification could increase retention, attention and interaction between users and applications or systems. The gamification component that will be applied in this design consists of four pieces, as the picture table in figure 6.

**Point calculation in application:**

In this paper, point calculation in this application is adopted by Ifrina Nuritha research in 2017 about Designing Gamification on Social Agriculture (SociAg) Application to Increase End–User Engagement (10).

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**Figure 6:** The gamification component that will be applied four pieces
Point calculation design in this application is explained in figure 7. In figure 7 there are three steps. The first step describes the points obtained when doing activities on the application. There are four types of activities that will be carried out as in the table in step 1. Rewards are a mark of achievement that comes from activities in the form of posting information by users. Points can increase and decrease with several conditions including: (i) Increases if you get likes by other users, (ii) Increases if users comment to other users, (iii) Reduces when posting information that has been deleted by the admin, (iv) Reduce if other users cancel their likes. Determination of the acquisition of points on the application based on definition 1 by forming a set of activities that contain the identity of the activity and the point of activity carried out. Step 2 explains the equation that is implemented when a user does an activity, the third step is the equation used to collect the total points obtained for all activities carried out in realtime. All points of activities carried out by the user will be accumulated and the total points obtained will be displayed in the application. Total point accumulation can be seen by the admin, representatives from the health service policy makers of health facilities, and account owner users as seen in the figure 8.

Figure 7: Point calculation in application

Figure 8: One of example about activity in app
Conclusion

Design of business process using a combination of gamification concepts and family approach can make it easier to draw up a Health Complaint Service System design so that it can support The Health Indonesia Program Through A Family Approach.

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