

## Children in-conflict chatbot system using natural language processing technique

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### Abstract

Chatbot support system aimed at addressing smoking and drinking behavior among juveniles through the application of natural language processing (NLP) techniques. Juvenile smoking and drinking have become pressing concerns in society, necessitating effective interventions to curb these behaviors. Traditional methods of counseling and intervention often face limitations in reaching and engaging with young individuals. Leveraging advancements in NLP, the proposed chatbot system offers an alternative approach for counseling and support. The system incorporates a comprehensive understanding of the underlying causes and motivations behind the delinquent behaviors, allowing the chatbot to engage in meaningful conversations with the juveniles. By employing NLP algorithms, the chatbot analyzes and interprets the language used by the individuals, providing tailored responses and guidance. The development process involves data collection from juveniles in conflict, constructing a knowledge base, training the chatbot model, and validating its effectiveness through user feedback and evaluation. Preliminary results indicate promising outcomes in terms of engagement, acceptance, and efficacy. The chatbot support system holds the potential to serve as a valuable tool in addressing smoking and drinking behaviors among juveniles, providing accessible and personalized support to help them make healthier choices. Further research and refinement of the system are necessary to enhance its accuracy, adaptability, and overall impact in real-world scenarios.

**Keywords:** Juvenile Behaviour; Chatbot Support; Natural Language Processing; Children in-conflict; Smoking; Drinking

### 1. Introduction

The aim of this study is to analyze the delinquent behaviors of juveniles residing in Manila using Natural Language Processing and to develop a chatbot counseling system to support children and set them on the path to becoming productive citizens. Additionally, counseling is crucial for kids to change their state of mind. The absolute necessity of strengthening boosts their self-esteem and gets rid of the stigma and other mental debilitating effects.

### 2. Related literature and studies

A group of researchers developed an automatic generation of conversation Chat between a computer and a human by developing an interactive artificial intelligent agent through the use of natural language processing and deep learning techniques such as Long Short-Term Memory, Gated Recurrent Units and Convolution Neural Network to predict a suitable and automatic response to customers' queries. Based on the nature of this project, we need to apply sequence-to-sequence learning, which means mapping a sequence of words representing the query to another sequence of words representing the response. Moreover, computational techniques for learning, understanding, and producing human language content are needed. In order to achieve this goal, this paper discusses efforts towards data preparation. Then,

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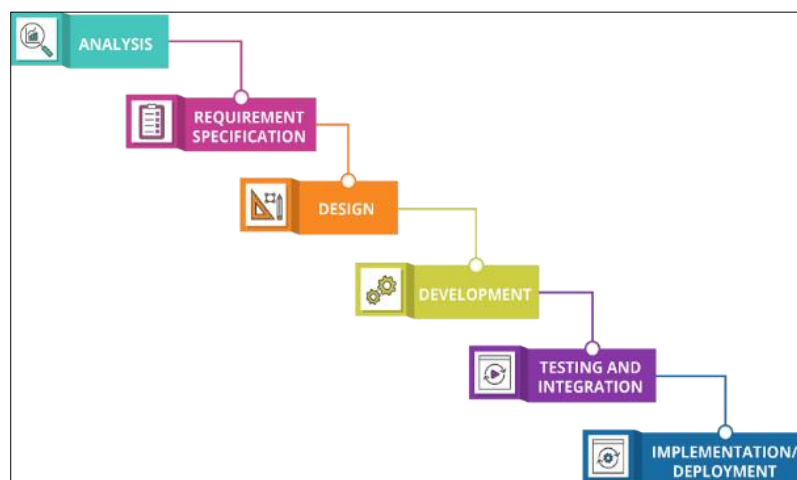
explain the model design, generate responses, and apply evaluation metrics such as Bilingual Evaluation Understudy and cosine similarity.

According to XiaoIce (Shum et al., 2018) and Woebot, a chatbot for mental health [1], and Replika (Ta et al., 2020) Tess (Fulmer et al., 2018) [2] and Patrick (et al., 2017) [3] show that Users' perceptions of relationships with chatbots may change. Ta and co. (2020) analyzed Replika user reviews and gathered open-ended survey responses from users of Replika. They discovered numerous instances of emotional and companion support that users feel the chatbot provides being tolerant, accessible, and able to respond to users' communication needs. Like this, Prakash and Das (2020) investigated customer feedback on the Woebot and Wysa, two chatbots for mental health, discovered that some users were generally inclined to describe the chatbots as a type of friend noting the compassionate, kind, and nurturing personalities of the chatbots [4].

Artificial intelligence, within the context of current technological developments, (AI) is one of the most rapidly growing fields. AI employs technologies that typically perform functions attributed to human intelligence and is implemented via computer. Conversational Programs, also known as "chatbots"—software that uses natural language to communicate with human users (Shawar and Atwell 2007) [5]. The Benefits of Using Chatbots for the purposes of prevention, treatment, or follow-up should be considered considering them in comparison to human therapists; unlike them, chatbots do not get tired or bored nor have personal prejudices. They are available 24 hours a day, no matter where the patient is, and the use of algorithms and neural learning may enable them to provide the most appropriate intervention based on the patient's diagnosis and treatment evolution (Gaggioli 2017) [6]. Chatbots may be able to circumvent traditional psychotherapy endemic barriers to provide psychoeducation or psychotherapy based on the needs of the user (Miner et al. 2016) [7].

### 3. Methodologies

The researchers used the Waterfall Model Software Development Life Cycle for designing, developing, and testing of software. Upon interviewing the possible users and experts in the field related to the study the researchers analyzed all the necessary requirements for the system. The researchers will visualize the system through requirements analysis and come up with a conceptual model of the study then moves to the next phase, the implementation and coding. To identify the faults of the system the researchers will conduct software testing. Once the system is fully functional and has met the requirements then it may now proceed to deployment all the way to maintenance.



**Figure 1** Waterfall Model Software Development Life Cycle

#### 3.1. Hardware and Software Components

A Laptop will be used for developing the model using an ASUS Notebook with (Intel® core™ i3 7th gen) with a clock speed of 2.3 GHz, 8.0 gigabytes (GB) random access memory (RAM), and a Windows 10 operating system. PHP will be used to develop the chatbot system and Visual Studio Code as the compiler.

### 3.2. Evaluation

The recommender system will be evaluated using ISO 25010 Standards. A product quality evaluation system is built around the quality model. The quality model specifies which quality characteristics will be considered when assessing the properties of a software product. The degree to which a system satisfies the stated and implied needs of its various stakeholders, and thus provides value, is defined as its quality. The needs of those stakeholders (functionality, performance, security, and maintainability, for example) are precisely what are represented in the quality model, which divides product quality into characteristics and sub-characteristics. A framework for assessing the quality of software products can be found in the ISO/IEC 25000 set of standards, popularly known as SQuaRE (System and Software Quality Requirements and Evaluation). Security, dependability, and maintainability are three of the eight software quality attributes, or system "-ilities," that are defined by ISO/IEC 25010.

## 4. Results and discussions

### 4.1. ISO 25010 Product Quality Characteristics

Table 1 shows the Functional Completeness resulted in a 4.82 weighted mean, Functional Correctness in a 4.71 weighted mean, Functional Appropriateness in a 4.82 weighted mean and all having the interpretation of Very high level. The overall weighted mean which is 4.78 resulted to an interpretation of Very high level.

**Table 1** ISO 25010 Product Quality Characteristics in terms of Functional Suitability

No.	Statements	Weighted Mean	Interpretation
1	The website functions cover all the specified tasks and user objectives.	4.82	Very high level
2	Degree to which a product or system provides the correct results with the needed degree of precision.	4.71	Very high level
3	Degree to which the functions facilitate the accomplishment of specified tasks and objectives	4.82	Very high level
GRAND WEIGHTED MEAN		4.78	Very high level

**Table 2** ISO 25010 Product Quality Characteristics in terms of Performance Efficiency

No.	Statements	Weighted Mean	Interpretation
1	The response and processing times of the website when performing its functions, meet requirements.	4.77	Very high level
GRAND WEIGHTED MEAN		4.77	Very high level

Table 2 shows the general evaluation in terms of Performance Efficiency. Time behavior resulted to a 4.77 weighted mean with the interpretation of Very high level and over all weighted mean of 4.77 with the interpretation of very high level.

Table 3 shows the Appropriateness Recognizability resulted in a 4.72 weighted mean, Learnability in a 4.80 weighted mean, Operability in a 4.64 weighted mean, User Error Protection in a 4.73 weighted mean, User Interface Aesthetics in a 4.71 weighted mean, Accessibility in a 4.79 weighted mean and all having the interpretation of Very high level. The overall weighted mean which is 4.73 resulted to an interpretation of Very high level.

**Table 3** ISO 25010 Product Quality Characteristics in terms of Usability

No.	Statements	Weighted Mean	Interpretation
1	The website is appropriate for the user's needs.	4.72	Very high level
2	The website can be used by specific user to express and learn more about the mental health of PLM students.	4.80	Very high level
3	The website is easy to operate and control.	4.64	Very high level
4	The website protects users against making errors	4.73	Very high level
5	The website's user interface enables pleasing and satisfying interaction for the user.	4.71	Very high level
6	The website can be used by significant users.	4.79	Very high level
GRAND WEIGHTED MEAN		4.73	Very high level

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## 5. Conclusion and recommendation

It is a web-based system that focuses to juvenile delinquents with the behavior of smoking and drinking. Users can take assessment to know and measure their delinquency level and know the plans, punishment, and fine if they violate the law again.

The evaluation of the chatbot support system using the ISO model of Functional Suitability, Performance Efficiency, and Usability offers valuable insights into its functionality, efficiency, and user experience. This evaluation process enables the identification of areas for improvement, ensuring that the system effectively addresses the targeted behavior and provides a user-friendly and impactful support system for juveniles dealing with smoking and drinking behavior.

This research was to help the local barangay to give awareness and provide chatbot for these children in conflict who are hesitant on expressing their feelings who are subjected to the behavior. The researchers recommend this study to the MDSW to provide more accurate data in other behavior and factors affecting the children in conflict.

The researchers also recommend providing hands-on assessment not only for counselling but also provide the possible reason when they commit the crime again against the law.

And lastly, the researchers would recommend to the future researchers to add more features like developing educational games when they commit this crime, they can be imprisoned, and their lives ruined. The researchers recommend having Tagalog in speech to text for those who do not understand and speak English.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The Authors proclaim no conflict of interest.

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