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Content analysis of PAU Kisan app for major crops

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Abstract
Content is the vital part in a communication process. The quality of content has a significant impact on the effectiveness and utility of any communication process. Analysis of content provided in online media have a great role in ensuring the quality. In agriculture field, online medias including mobile apps are the most widely used media among farmers. The present study entitled "Content Analysis of PAU Kisan App for Major crops" was undertaken with the objective to analyse the content of app given under major crops in terms of readability ease, sufficiency of content, suitability of heading, uniformity in categorization of content, size and style of font, use of technical terms and availability and clarity of photographs. Total eight major crops were selected for the study *viz*, Wheat, Autumn sugarcane, Spring sugarcane, Desi cotton, Cotton, Paddy, Maize and Basmati rice. The results showed that the reading ease of content under major crops falls within standard and fairly difficult categories with scores ranges from 53.14 to 66.04. Photographs were completely available for the given content but clarity was less for many of them. The sufficiency level of content found high in comparison to package of practices. The headings given were completely suitable to the content provided and the categorization of contents followed a uniform pattern under each major crop. The percentage of technical term used in the content varied between 7.50% to 14.05% and the size and style of font displayed will be according to the default settings of smartphone.

Keywords: Content analysis, crops, sufficiency, availability, reading ease

Introduction
Agriculture is one of the most important vital sectors in our nation. Majority of the Indian population (58%) takes agriculture and allied activities as primary occupation. About 20 per cent of India's GDP comes from agriculture and allied sector (Anonymous 2021) [1]. Making best decisions in agriculture and related industries requires timely access to technologies and information. There are numerous sources which provides information about farming, including written materials, audio and visual aids, newspapers, television, the internet, mobile devices, etc., but the formats and structures of the information vary according to different media (Patel and Patel 2016) [10]. India has the second largest percentage of internet users in world, however just 20 per cent of the country's people are online and it is expected to see an increase in the proportion of internet users in nations like India as internet usage continues to rise. (Anonymous 2022) [2] ICTs (information and communication technologies) are enabling access and exchange of information in a quicker way. A variety of mobile applications have been created by government agencies, agricultural institutions, and the business sector for bridging the digital divide. A lot of mobile apps, particularly those that focus on production technologies and agricultural consulting services, make it their mission to update and provide accurate information. These apps provide a way to interact with various farmers and experts, learn from them, and share knowledge in order to support farmers in making informed decisions about the viability and sustainability of their business in an ever-changing environment of markets, policies, and other factors (Ghanghas *et al* 2021) [5].

Content analysis is a method of studying and analysing communication in systematic objective and quantitative measure for the purpose of quantitative variables (Kerlinger 1986) [9]. Content analysis is essential in the ever-growing field of human behavioural science. The communication analysis covers all the component of communication *viz*, who, what, when, how, what effect and whom. (Jaura 2006) [6] Ensuring the quality and quantity of the information is the major responsibility of a communicator. Frequent analysis of the content can make the communication system more reliable and trustworthy to the end users. Punjab is one of the leading states in agriculture production especially in case of rice, wheat and other field crops. So that, the information provided regarding major crops plays a significant role in overall production. Punjab Agricultural University took the initiative for the dissemination of newly evolved technologies and other information through mobile app named 'PAU Kisan App' in September 2019. This initiative was expected to meet the existing gap in information dissemination in Punjab. This study was

attempted with objective to analyse the content of major crops.

Materials and Methods

The current study was intended to analyse the content under major crops of PAU Kisan App *viz*, Wheat, Autumn sugarcane, Spring sugarcane, Desi cotton, Cotton, Paddy, Maize and Basmati rice. Content analysis can be done using both quantitative and qualitative methods. The methods of analysis followed in the current study was in terms of readability ease, sufficiency of content, suitability of heading, uniformity in categorization of content, size and style of font, use of technical terms and availability and clarity of photographs.

For finding out reading ease score of the content, the Flesch formula (1951) was used which is represented as below;

Reading ease score = 206.835 - 84.6 WL - 1.015 SL

WL - Average word length in syllables
SL - Average sentence length in words

In order to interpret the reading score, description style given by Flesh will be used, which reads as follows; (Bendova 2021) [4].

Table 1: Flesch's reading ease score interpretation

Sl. No	Reading ease score	Description style	Estimated reading grade
1.	90-100	Very easy	5th grade
2.	80-90	Easy	6th grade
3.	70-80	Fairly easy	7th grade
4.	60-70	Standard	8th and 9th grade
5.	50-60	Fairly difficult	10th to 12th grade
6.	30-50	Difficult	13th to 16th grade
7.	0-30	Very difficult	College graduate

Sufficiency of content was measured by comparing the total content under each selected crops with the content given in latest package of practices published by Punjab Agricultural university. It was calculated in three-point scale i.e., completely available, partially available, not at all available with scores 3, 2 and 1 respectively. Total eight sections were observed under each crop. Sufficiency was measured for each section and total score of each crop was calculated and categorised into high, medium and low. Suitability of heading referred to whether the content given under a specific heading completely represent the particular topic or not. It was calculated on three-point scale.

Uniformity in categorization of content referred to the uniform distribution of sub headings under each major crop. It was calculated in three-point scale i.e., completely uniform, partially uniform, not at all uniform with scores 3, 2 and 1 respectively.

The percentage of technical terms used under each crop was calculated by dividing total number of technical terms by total number of words. It was calculated separately for the whole content under each selected crop.

Availability of photographs referred to number of photographs present in weed management, insect pest management, disease management and deficiency management sections under each crop. Clarity of image given in each section was measured in three-point scale i.e., completely clear, partially clear, not at all clear with scores 3, 2 and 1 respectively. Clarity was measured with respect to the understandability of the image given. Total number and percentage of photos which were completely clear, partially clear, not at all clear was calculated separately for the content under each crop.

Results and Discussion
Reading ease score

The reading ease score was calculated using Flesch's formula. The Flesch's reading ease score of any content lies between 0 to 100. The ease of reading will increase with increase in the score of the content. i.e., when reading ease score increases the complexity of the text structure decreases. According to different categories the reading grade was also estimated. The reading ease score for each crop was calculated separately and it is presented in Table 2. The reading ease score of different crops revealed that the difficulty level of contents under all crops falls within the category fairly difficult and standard. Results showed that information given for autumn sugarcane, spring sugarcane and maize falls under the standard category which had reading ease score of 66.04, 64.93 and 60.44 respectively and have a reading grade of 8th and 9th level. The other crops wheat, desi cotton, cotton, paddy and basmati rice falls under the category fairly difficult which had reading ease score of 59.04, 55.23, 57.36, 58.83, and 53.14 respectively and had reading grade of 10th to 12th level.

It can be concluded that the content given in PAU Kisan App under major crops are easily understandable for the respondents those who are having high school level of educational qualification or above. This was in line with the study conducted by Kaur (2013) [8] reported that the reading difficulty (7.7) of content of Changi Kheti magazine was easy to understand for general people.

Table 2: Reading ease score of content under major crops

Sl. No	Crop	Reading ease score	Category	Reading Grade
1.	Wheat	59.04	Fairly difficult	10th to 12th grade
2.	Autumn sugarcane	66.04	Standard	8th and 9th grade
3.	Spring sugarcane	64.93	Standard	8th and 9th grade
4.	Desi cotton	55.23	Fairly difficult	10th to 12th grade
5.	Cotton	57.36	Fairly difficult	10th to 12th grade
6.	Paddy	58.83	Fairly difficult	10th to 12th grade
7.	Maize	60.44	Standard	8th and 9th grade
8.	Basmati rice	53.14	Fairly difficult	10th to 12th grade

Availability and clarity of photographs
Photographs plays an important role in communicating the information in a faster and effective way. Especially in case of weeds, damage done by insects and pest and symptoms of disease infestation images are necessary. In these cases, photos can convey the information in an effective way more than words can do. In PAU Kisan App photographs were available in weed management, insect pest management, efficiency management and disease management sections under each crop.

The study on availability of photographs revealed that the photographs were completely available in each section under each crop. Photographs were provided for the information provided under above mentioned sections of each crop.

Table 3: Availability and clarity of photographs under major crops

Sl. No	Crop	No. of available photos	Fully clear f (%)	Partially clear f (%)	Not at all clear f (%)
1.	Paddy	24	15 (62.50)	8 (33.33)	1 (4.16)
2.	Basmati	24	18 (75.00)	6 (25.00)	-
3.	Wheat	23	18 (78.26)	4 (17.39)	1 (4.34)
4.	Autumn sugarcane	19	12 (63.15)	6 (31.57)	1 (5.26)
5.	Spring sugarcane	21	13 (61.90)	8 (38.01)	-
6.	Desi cotton	12	5 (41.66)	5 (41.66)	2 (16.66)
7.	Cotton	22	10 (45.45)	10 (45.45)	2 (9.09)
8.	Maize	10	6 (60.00)	4 (40.00)	-

Figures in parenthesis indicates percentage

The data presented in Table 3 showed that total number of photographs provided under each crop varies between 10 to 24. It can be observed that more than half of the photographs provided under Paddy (62.50%), Basmati (75%), Wheat (78.26%), Autumn sugarcane (63.15%), Spring sugarcane (61.90%) and Maize (60%) were fully clear. The percentage of partially clear photos were 33.33%, 25%, 17.39%, 31.57%, 38.01% and 40% respectively. In case of Cotton (45.45%) and Desi cotton (41.66%) only less than half of the photos were fully clear. Under Paddy (4.16%), Wheat (4.34%), Autumn sugarcane (5.26%), Desi cotton (16.66%) and Cotton (9.09%) some photos were not at all clear. Similar findings were also found by Joshi and Laharia (1990) [7] that the quality of 52% of photographs used in Krishi Darshan programme was good.

Sufficiency of content
Sufficiency of content according to the need of user is a major factor which determine the utility of communication system. Sufficiency was measured for each section under each crop with comparison to package of practice by Punjab Agricultural University.

It can be noticed from the Table 4 that the score obtained for each crop falls within the range 19 to 24 which belongs to the category of high availability. Even though some information in all crop were missing as compared to package of practices, the overall availability lies in high level. The information were lacking in insect pest management, disease management and deficiency management sections. Some of the general information like soil and climate, agronomic practices were also lacking.

Table 4: Sufficiency of content under major crops

Sl. No	Crop	Sufficiency of content
1.	Paddy	21 (high)
2.	Basmati	22 (high)
3.	Wheat	19 (high)
4.	Autumn sugarcane	21 (high)
5.	Spring sugarcane	21 (high)
6.	Desi cotton	21 (high)
7.	Cotton	22 (high)
8.	Maize	20 (high)

Suitability of heading
Headings are very important for the users of PAU Kisan App. Headings attracts the attention and persuade the reader to the whole content. Suitability of heading was measured for each section under each crop in three-point continuum.

Table 5: Suitability of heading of different sections under major crops

Sl. No	Crop	Suitability of heading
1.	Paddy	24 (High)
2.	Basmati	24 (High)
3.	Wheat	24 (High)
4.	Autumn sugarcane	24 (High)
5.	Spring sugarcane	24 (High)
6.	Desi cotton	24 (High)
7.	Cotton	24 (High)
8.	Maize	24 (High)

There were eight sections under each crop which is further divided into several heads which leads to particular information. All the headings under each section were evaluated and scored. Total score for each crop is presented in Table 5. The data presented revealed that heading of each section under each crop is completely suitable to the information given.

Uniformity in categorization of content
Uniformity in categorisation of contents under each crop have significant impact in easiness of finding a particular information thus further contribute to the user friendliness

of the app. Here, uniformity of categorisation of sub topics under major crops have been studied and presented in Table 6. The study revealed that content given under every crop was categorized in a completely uniform way.

Table 6: Uniformity in categorization of content under major crops

Sl. No	Crop	Uniformity in categorisation
1.	Paddy	24 (High)
2.	Basmati	24 (High)
3.	Wheat	24 (High)
4.	Autumn sugarcane	24 (High)
5.	Spring sugarcane	24 (High)
6.	Desi cotton	24 (High)
7.	Cotton	24 (High)
8.	Maize	24 (High)

Percentage of technical terms

The use of technical terms has a significant role in the understandability of content especially for farmers those who are not familiar with technical terms. Similar views were mentioned in study done by Saini and Kaur (1996) [12] in which 68% of the respondents opinioned that partial understandability of content was due to the use of technical terms.

The analysis of data in Table 7 showed that the percentage of technical term used in PAU Kisan App in content given under major crops varied between 7.50% to 14.05%. The maximum percentage was found in the content given under Basmati (14.05%), followed by Maize (13.86%), Desi cotton (12.70%), Cotton (11.88%), Paddy (10.63%), Spring sugarcane (10.62%), Wheat (10.19%) respectively and least percentage of technical terms was in content under Autumn sugarcane (7.50%). The major part of technical terms was used in weed management, insect pest management and disease management sections. Similar findings were also reported by Bardhan *et al* (2021) [3] that the main topics covered in the part which had higher readability rating were plant protection issues, their controls, and related actions.

Table 7: Percentage of technical terms in content under different crops

Sl. No	Crop	Percentage of technical terms used
1.	Paddy	10.63
2.	Basmati	14.05
3.	Wheat	10.19
4.	Autumn sugarcane	7.50
5.	Spring sugarcane	10.62
6.	Desi cotton	12.70
7.	Cotton	11.88
8.	Maize	13.86

Size and style font used

The size and style of font used for communication plays an important role in determining the attractiveness of the page. The size and style of the font shown in PAU Kisan App will be the default style and size of the mobile phone in which users downloaded the app. Which provide more familiarity with the screen presented in app.

Conclusion

The current study was intended to analyse the content given in PAU Kisan App under major crops. The text and

photographs given were analysed to improve the app accordingly. The study revealed that the easiness of text of the content given in PAU Kisan App under major crops are easily understandable for the farmers or other beneficiaries those who have high school or above level of educational qualification. The majority of photos were fully clear while some of them was not. clarity of photographs can be improved for better understanding and identification of symptoms in their own farm situation. As compared to package of practice by Punjab Agricultural University, the study found that the availability of content was high. The headings were completely suitable and the categorization of content was uniform under each major crop. The percentage of technical terms used was also less which makes the app more understandable. For making a better version of PAU Kisan App it can be updated according the existing gaps which were revealed through the study.

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