

Critical analysis on Implementation of GIS on Indenting of Sarva Siksha Abhiyan Schools.

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Abstract:

In the 21st century, the world has witnessed mammoth & monumental technological development, scientific advancement, economic progress & tremendous growth in every walk of life. Heuristic observation & Empirical estimation discovered that a major chunk of children in the developing countries are yet to be empowered with education. At this backdrop, India has initiated a wide range of educational programme with a broader spectrum to promote & popularize elementary education. One such profound & prudent educational programme is the Sarva Siksha Abhiyan [SSA]. Its objective is to provide free education to all the children in the age-group of 6 years to 14 years. To deal with such a gigantic initiative which is exceedingly supported by extensive resource engagement, expansive infrastructural build-out, massive fund-flow, robust operational framework, collaborative & cohesive effort of central government, state government & local governance system, Several studies has identified a common area of concern, that is, having prodigious operational framework, the enrollment & retention of students in the school is not very encouraging & encompassing. To manage, monitor & maintain the programme that has a massive geographic spread & diversified demographic mix, is a colossal challenge. A comprehensive study has been made upon a district called Ganjam of the state Odisha to establish a simple, smooth, seamless & sustainable operational system. It has been envisaged to come up with a real-time location-based indenting system to elevate & uplift the programme to attend & achieve the programme objectives.

Keywords: GIS, Elementary Education, SSA, Real-time indenting, Location-based indenting, SSA School indenting, GIS based indenting

Introduction

Education is a key instrument for social, political & economic development. A well read & well informed population is found to be productive & constructive to create its stand, stance & stand-point in the VUCA world. United nations organization [UNO] has been striving hard to encourage & encompass education. It has come up with sustainable development Goal-2030. The fourth one out of the seventeenth agendas is the SDG-4 which illustrates deeply

about the elementary education. It emphasizes on inclusive & equitable quality education. The Indian Government has brought about a gamut of elementary educational programmes. One of such prodigious & phenomenal elementary education programme is called as the Sarva Siksha Abhiyan [SSA]. Under this programme, all the children within the age group of six to fourteen years to be offered with free education with books, uniforms, shoes and other provisioning including mid-day meal. In this programme, the Central Government works very closely in collaboration with State Government & Local Governance System involving immensely the community. Community engagement rejuvenates the programme.

As there is enormous engagement of human resources, extensive & expansive distribution system and the beneficiaries, the students, whose number is astronomically high and need close, continuous & consistent attention. Failing which, they stop coming to the school. Many researches have observed that the increase in enrollment & retention of the students in the school from standard one to eight is very much influenced by the distribution system. Most of the essential elements of SSA depends solely on distribution system. Little delay in the distribution may cause substantial & significant setback in the schooling. It will inhibit the school activity & impede the SSA progress. One of the major stakeholder of the entire distribution system is the Head Master of the school. Under the SSA provisioning, the Head Master is responsible for raising the indent, which makes the entire distribution process operational. The definition of indent in the context of the study is placing an order of all the essential items required to run the SSA schools. To give a concise statement on indenting, the number of School Uniform, size of the Uniform, categories [boys & girls] required for the school, the books list, Mid-day meal items & all other items that are provided free to the students under SSA.

It has been heuristically observed through a penetrative & perceptive study, empirically estimated and statistically analyzed that indenting is the critical element in the entire process. In the existing system, there is an unintentional delay of indent raising because of semi-manual MIS system. Considering the size, magnitude & dimensions of transactions, it is imperative & indispensable to enhance & improvise the system to minimize / nullify the delay. Contemplating the gravity of the problem, it was envisaged to develop a Real-time, location-based indenting system, that could make a paradigm shift in the indenting there by reducing the waiting time, increasing the delivery efficiency, effectively manage the process end-to-end. This results in establishing a candid & conducive ambiance for the students to continue schooling, encouraging & encompassing enrollment & retention of the students.

Domain knowledge acquisition & Gap identification :

A gamut of research findings were deeply analyzed & a few are shared to support the current study. The followings are found to be potent & pertinent, apt & appropriate for the research.

L P Utomo et al. (2019) made a deep investigation and experience the lack of sync & synergy in the processes as it caters to enormous needs at various level in distinct geographic spread & distinguished demographic mix. Further, proposed to induct digital intervention through a pilot demonstration on GIS mapping with facilities.

N. Adhikari et al. (2019) considered the foundational & fundamental component of the programme that happens to be the key enabler in enhancing enrollment & ensuring retention that is the nutritional value of the Mid-day meal. The study made an extensive analysis with expansive coverage of the beneficiaries and demonstrated the pilot implementation of GIS to monitor and manage the Mid-day meal ecosystem.

Farwis Mahrool et al. (2020) accentuated & underlined the fact that the drop-out happens because of a set of reasons, one of the very prime prospect is the prompt support of the system & pedantic response to the necessary & essential goods & services that drives elementary education. Further, he demonstrated through a pilot implementation, The GIS mapping of distribution system to strengthen the system to attain & achieve the desired objectives.

By making an insightful & intuitive exploration & examination, it was appraised and appreciated to institutionalize digital intervention through GIS in to the SSA programme. Considering & contemplating all the findings, suggestions, observations, analysis, interpretations, demonstrations & digital interventions, it was resolved that implementation of GIS happens to be the most convenient & expedient tool to strengthen the distribution process which, in fact, tangibly & intangibly impact & influence the enrollment & retention by synchronizing the processes & establishing synergy among the stakeholders.

Modus Operandi

Considering & contemplating the the problem identified through the review of literature, it was envisaged to bring digital intervention through the introduction of the Real-time, Location-based monitoring System called GIS. To do the needful, a pilot interaction was done with the Head Masters [stakeholders] of the school. The interaction revealed the clarity & sterility of the problem. Based on the findings, a questionnaire was designed & survey was made in two phases as pre-implementation phase & post-implementation phase. Pre-implementation phase is the existing system status & post-implementation is considered when the respondents, the Head Masters got trained with the digital intervention that is GIS, There after the post phase responses were collected.

Instead of considering the entire population, which is a cumbersome task, a portion (Sarangi, 2010b; zikmund et al.,2013) is selected for analysis. In context of the research, the Ganjam district of Odisha has been considered. The selection of the district is purely based on accessibility & availability.

Looking at the aforesaid aspect, a population of fourteen hundred schools were selected with fourteen hundred Head Masters. The sample size was determined using the following formula,

$$\text{Sample Size} = N / \{1 + (SD)^2 \times N\};$$

SD = Standard Deviation

N = population size

The Sample size turned out to be 311. Simple Random Sampling technique was used to prepare the sample for the study. The research surveyed 400 Head Masters instead of 311, in anticipation of external constraints that may limit the number during the survey.

Out of the gamut of statistical tools available, two most apt & appropriate tools were selected for the data analysis. The tools are Chi-Square Test & Linear Logistic Regression. The following section enumerates the data analysis & result declaration.

Results on Head Masters Self-Review on Indenting

The Head Master's self-review on indenting assists & aids to the study to have detailed understanding with deeper insight about the processes involved in the School management. The Head Master is the witness of the pre-phase & post-phase of digital intervention, that is, the real-time location based management & monitoring system [GIS]. The study aims at uplifting & facilitating, enhancing & improving the existing system for easy, smooth & seamless transaction, that happens to reduce the redundant work to the best possible extent & making the data capture comfortable & convenient. Having been endorsed & espoused, the Head Master ascertains for unbiased response to the study.

GIS Implementation on Indenting: As Viewed by Head Masters

In the context of the study, indenting is the process of ordering the goods & services for the apt & appropriate management of school activities that includes but not limited to books, uniforms, food material for mid-day meal & etc. The Head Master identifies, articulates & indents the requirement to the higher level for approval & further processing.

Table 1 : Profile of Head Masters' Self-Review on Indenting During Pre and Post Implementation of GIS.

		Pre		Post		χ^2 value
		Frequency	Percent	Frequency	Percent	
Indent is prepared real-time	Yes	63	15.8	260	65.0	201.51*
	No	337	84.3	140	35.0	
Indent is raised real-time	Yes	96	24.0	260	65.0	136.13*
	No	304	76.0	140	35.0	
Indent reaching to Authority real-time	Yes	32	8.0	273	68.3	307.76*
	No	368	92.0	127	31.8	
Indent update is done real-time	Yes	56	14.0	274	68.5	245.13*
	No	344	86.0	126	31.5	
Indent approval status reaches the school real-time	Yes	72	18.0	270	67.5	200.23*
	No	328	82.0	130	32.5	
Indent closure is done real-time	Yes	56	14.0	263	65.8	223.41*
	No	344	86.0	137	34.2	
Indent closure is reaching the Authority real-time	Yes	48	12.0	255	63.8	227.63*
	No	352	88.0	145	36.3	

N.B.:- * – Significant at 5% Level ($P < 0.05$) for $DF=1$.

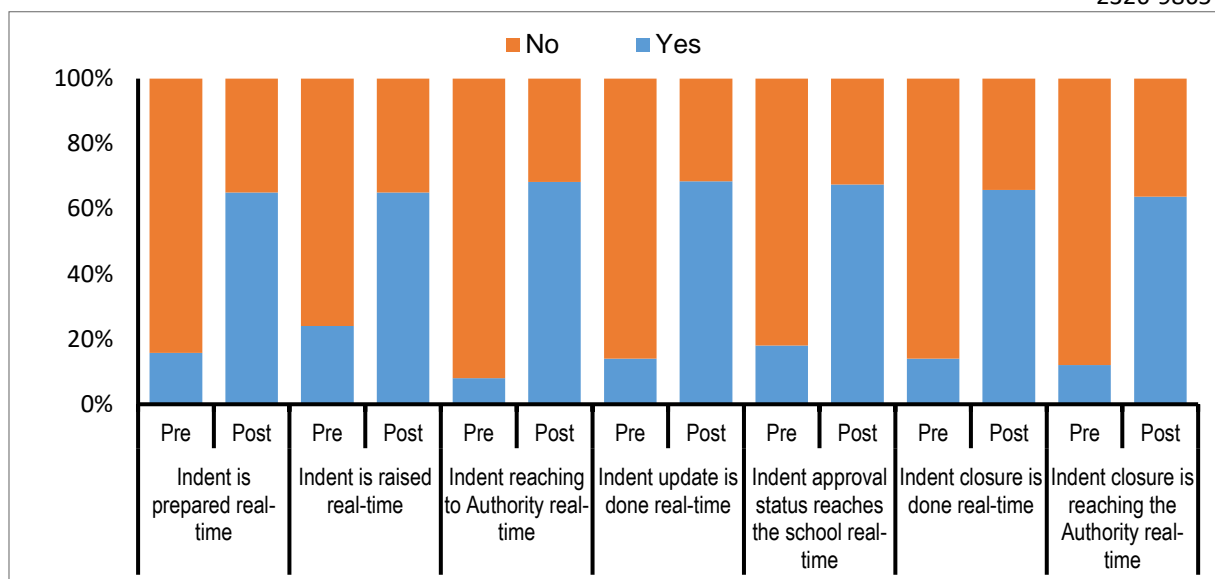


Figure-1: Profile of Head Masters' Self-Review on Indenting During Pre and Post Implementation of GIS.

To have a concise elaboration : Table-1 and Figure-1 present the profile of Head-Masters' Self-Review on indenting on implementation of GIS. For this χ^2 -test for every aspect of indenting has been performed by considering the stage of implementation of GIS (Pre / Post) in order to investigate the association between the two. This will signify the effectiveness of GIS in indenting by the Head Masters.

The study has been conducted to look in to the significance of linkage between stages of implementation of GIS and availability of that for real-time preparation of indent. The calculated χ^2 -value (201.51) significant at 5% level ($P < 0.05$) for $DF=1$ indicates the significant relationship between the two. The frequencies and percentages show that 15.8% agreed in pre-stage has increased to 65.0% whereas 84.3% disagreed in pre-stage has reduced to 35.0% in post-stage for real-time preparation of indent. Hence, implementation of GIS has significant effective impact as well as association with real-time indent preparation.

Table-2: Logistic Regression on Head Masters' Self-Review After Implementation of GIS on Real-Time Preparation of Indent.

	B	S.E.	Wald	df	Sig.	Exp(B)	Omnibus χ^2
Age	0.008	0.023	0.124	1	0.725	1.008	0.124 ^{NS} (DF=1)
Constant	0.233	1.102	0.045	1	0.832	1.263	
Gender	-0.108	0.214	0.253	1	0.615	0.898	0.124 ^{NS} (DF=1)
Constant	0.771	0.318	5.861	1	0.015	2.159	
Rural Teaching Experience	-0.005	0.030	0.027	1	0.870	0.995	0.027 ^{NS}

Constant	0.674	0.353	3.650	1	0.056	1.962	(DF=1)
Rural Administrative Experience	-0.020	0.035	0.325	1	0.569	0.980	0.325 ^{NS}
Constant	0.775	0.294	6.963	1	0.008	2.170	(DF=1)
Urban Teaching Experience	0.036	0.039	0.836	1	0.36	1.037	0.842 ^{NS}
Constant	0.261	0.404	0.415	1	0.519	1.298	(DF=1)
Urban Administrative Experience	0.012	0.042	0.081	1	0.776	1.012	0.081 ^{NS}
Constant	0.540	0.298	3.276	1	0.070	1.715	(DF=1)

N.B:- NS – Not Significant at 5% level ($P > 0.05$), Overall Percentage of Dependent Variable = 65.0%.

To have a concise elaboration, Table-2 presents the results obtained on application of logistic regression analysis over the dichotomous dependent variable i.e. Head Masters' Self-Review on real-time preparation of indent after implementation of GIS (Scored as "0" for "No" and "1" for "Yes") with age / gender / rural teaching experience / rural administrative experience / urban teaching experience and urban administrative experience as independent variable. By this the effect of independent (age / gender / rural teaching experience / rural administrative experience / urban teaching experience and urban administrative experience) on dependent (Head Masters' Self-Review on real-time preparation of indent after implementation of GIS) may be tested. Here the probability of implementation of GIS for real-time preparation of indent may be predicted in reference to age of Head Masters. In this case, overall 65% of cases for the dependent variable (real-time preparation of indent on implementation of GIS) have been correctly predicted.

For judging the effect of age over real-time preparation of indent on implementation of GIS, the Omnibus χ^2 -value (0.124) non-significant at 5% level ($P > 0.05$) for DF=1 may be referred. This shows that the model is not statistically significant and establishes the fact that Age has no significant impact over implementation of GIS on real-time preparation of indent. Hence Head Masters of all age groups are well adapted as well as accepted the GIS system in real-time preparation of indent. The mathematical expression in this regard will be

$$\log\left(\frac{p}{1-p}\right) = 0.233 + 0.008 * \text{Age}$$

where

p = Probability of GIS implementation for real-time preparation of indent.

Table-3: Logistic Regression on Head Masters' Self-Review After Implementation of GIS on Raising Real-Time Indent.

	B	S.E.	Wald	df	Sig.	Exp(B)	Omnibus χ^2
Age	-0.002	0.023	0.010	1	0.921	0.998	0.010 ^{NS}
Constant	0.728	1.102	0.436	1	0.509	2.070	(DF=1)
Gender	-0.244	0.213	1.311	1	0.252	0.783	1.308 ^{NS}
Constant	0.962	0.319	9.084	1	0.003	2.617	(DF=1)
Rural Teaching Experience	-0.009	0.030	0.098	1	0.754	0.991	0.098 ^{NS}
Constant	0.724	0.353	4.210	1	0.040	2.064	(DF=1)
Rural Administrative Experience	-0.033	0.035	0.853	1	0.356	0.968	0.855 ^{NS}
Constant	0.872	0.295	8.740	1	0.003	2.393	(DF=1)
Urban Teaching Experience	0.004	0.039	0.010	1	0.921	1.004	0.010 ^{NS}
Constant	0.580	0.404	2.067	1	0.151	1.787	(DF=1)
Urban Administrative Experience	0.034	0.042	0.679	1	0.410	1.035	0.682 ^{NS}
Constant	0.388	0.298	1.703	1	0.192	1.475	(DF=1)

N.B:- NS – Not Significant at 5% level ($P > 0.05$), Overall Percentage of Dependent Variable = 65.0%.

For judging the effect of age over real-time raising the indent on implementation of GIS, the Omnibus χ^2 -value (0.010) non-significant at 5% level ($P > 0.05$) for DF=1 may be referred. This shows that the model is not statistically significant and establishes the fact that Age has no significant impact over implementation of GIS on real-time raising the indent. Hence Head Masters of all age groups are well adapted as well as accepted the GIS system in real-time raising the indent.

Conclusion

The profound & pragmatic pilgrimage from understanding the social & societal impact of education, realizing the pragmatic elementary educational initiative SSA by Government of India in collaboration with State Government & Local Governance System encouraging & encompassing community engagement, identifying the scope of improvement in establishing a simple, seamless & sustainable operational framework, a holistic study has been made considering the pyramid of SSA but emphasizing the bottom of the pyramid [the prime driver of the programme, The Head Master]. The act of open & unbiased participation of the school Head Masters helped the research to capture the appropriate data by making suitable interaction with rest of the schools under study. The plethora of results from the statistical

analysis discerned & discovered that the Head Masters irrespective of their age, gender, experience in rural & urban teaching, experience in rural & urban school administration feel much better in the preparation, raising, updating & preparing the closure document after the implementation of GIS.

As a consequence, this is concluded & culminated with conviction that the aim & objective of the research considering the geographic spread & demographic mix, has been successfully achieved & accomplished .

The SSA programme is a mammoth & monumental initiative having a wider coverage with broader spectrum. It has certain factors of immense importance to be considered for smooth & sustainable implementation. One of the most important aspect that has deep impact & monstrous influence, has been very successfully addressed here. But there are other areas in the programme, where abundant possibilities are there for future research. Besides, there is ample scope to upgrade the proposed model to accommodate future requirements & norms of the programme. The future research may include but not limited to technology intervention, policy intervention, process intervention with universal provisioning of scalability, extensibility & reliability. As the the study has been made on one district of the state of Odisha, it can be expanded to other districts & beyond as well.

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