Measuring Schools Readiness in Industry 4.0 Based on the School's Web Profile

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Abstract—**School websites generally have a function as an information medium and have a function as a school administration tool. As a function of information media, the web can become a medium of communication, become a medium of interaction and become a medium of collaboration among stakeholders. Whereas as an administrative function, the web can be used for portal academic administration systems to store data, handle academic transactions and provide academic reports. Some literature shows the correlation between industry 4.0 and information technology, especially in education, which is known as the evolution of the educational platform namely education 1.0, education 2.0., education 3.0, and education 4.0. This paper will discuss the readiness of schools in Ogan Ilir South Sumatra in industry 4.0 which can be observed from the school's web profile. The research was conducted by examining the structure of the school web and retrieving data related to web performance both technically and usability. Sample research was taken from several high school websites, both public and private schools. The results of this study will raise an analysis gap regarding the readiness of Schools in Ogan Ilir in entering industry 4.0 seen from the school's web profile.**

Keywords—*industry 4.0; education x.0; schools web profile; gap analysis*

I. INTRODUCTION

The industrial revolution 4.0 was marked by the presence of manufacturing technology that entered the era of data automation and exchange including cyber-physical systems, internet of things (IoT), cloud computing, and cognitive computing. The development of this era can be observed in the many changes that affect many aspects of business, industry, social life, politics and education. The birth of ride sharing applications changed conventional ways of transport service transactions. The emergence of cloud-based applications makes it easy for people to meet virtually and elaborate on shared capabilities. Of course in the world of education, this era can be felt with many educational support applications one of which is the Massive Online Open Course, where courses can be held anytime, anywhere at a much lighter cost compared to conventional course models.

Lee et al explain, industry 4.0 is characterized by an increase in digitalization of manufacturing driven by four factors: 1) an increase in data volume, computational power, and connectivity; 2) the emergence of analysis, capabilities, and business intelligence; 3) the occurrence of new forms of interaction between humans and machines; and 4) improvement of digital transfer instructions to the physical world, such as robotics and 3D printing [1]. Liffler and Tschiesner added, the basic principle of Industry 4.0 is the integration of machines, workflows and systems, by implementing intelligent networks along the chain and production process to control each other independently [2].

Industry 4.0 is an industry that combines automation technology with cyber technology. This is a trend of automation and data exchange in manufacturing technology, including cyber-physical systems, the internet for everything or the Internet of Things (IoT), cloud computing and cognitive computing. Industry 4.0 produces "smart factories". In a modular, intelligent structure factory, cyber-physical systems supervise physical processes, create virtual copies of the physical world, and make decisions that are not centralized. Through the internet for everything (IoT), the cyber-physical system communicates and cooperates with one another and humans at the same time. Through cloud computing, internal and cross-organization services are provided and utilized by various parties in the value chain.

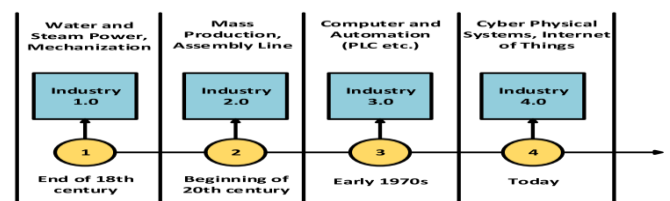The stages of industrial revolution 4.0 can be seen from the following picture:

Fig. 1. Industrial revolution (source).

- Industry 1.0: This era emerged steam engines and work models that turned into mechanistic

- Industry 2.0: This revolution began at the beginning of the 20th century, with the emergence of mass production and making production processes by means of production lines

- Industry 3.0: Beginning in the 1970s, production machines based on mechanics and electricity were

replaced by electronic devices that could be programmed either by computer or by Programmable Logic Controller (PLC). Smart production. The emergence of the Internet of Things and the integration of physical and virtual technology into three-dimensional printing machines became a marker of changes in the industrial era to be connected to each other.

To perform the Industry 4.0, there are basically six different design principles. These are, respectively, interoperability, transparency of information, technical support, real-time data acquisition and processing, modularity and distributed decision [3].

The technology-readiness construct refers to people's propensity to embrace and use new technologies for accomplishing goals in home life and at work. The construct can be viewed as an overall state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition to use new technologies [4].

The TRI (Technology Readiness Index) identifies four dimensions of technology belief that impact an individual's level of techno-readiness.

- Optimism: A positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives

- Innovativeness: A tendency to be a technology pioneer and thought leader

- Discomfort: A perceived lack of control over technology and a feeling of being overwhelmed by it

- Insecurity: Distrust of technology and scepticism about its ability to work properly.

Of these four dimensions, optimism and innovativeness are drivers of technology readiness, whereas discomfort and insecurity are inhibitors [4].

While in the world of education has also gone through the era of education 1.0, education 2.0 and education 3.0. In general, the following table shows how the evolution of education occurs and within clear boundaries.

TABLE I.   HOW THE EVOLUTION OF EDUCATION OCCURS AND WITHIN CLEAR BOUNDARIES

	Education 1.0	Education 2.0	Education 3.0
Meaning is	dictated	Socially constructed	Socially constructed and contextually
Technology is	Confisacted at the classroom door (digital refuges)	Cautiously adopted (digital immgrants)	Everywhere (digital universe)
Teaching is done	Teacher to student	Teacher to student and student to student (progressvism)	Teacher to student, student to, student to teacher, people-technology-people (co-contructivism)
Schools are located	In a building (brick)	In a building or online (brick and click)	Everywhere (throughly nfused into society: cafes, bowling alleys, bars, workplaces, etc)
Parents view schools as …	daycare	daycare	A place for them to learn, too
Teacher are	Licensed professionals	Licensed professionals	Everbody, everwhere
Hardware and software in schools ..	Are purchased at great cost and ignored	Are open source and available at lower cost	Are avaible at low cost and are used purposively
Industry views graduates as	Assembly line workers	As ll-prepared assembly line workers in a knowledge economy	As co-workers or enterpreneurs

Looking at the character of each era in X.0. Real influence is felt 3.0 is an implementation of industry 4.0 in the education sector. Web technology itself has developed so rapidly starting from web versions 1.0, 2.0 and 3.0. The meaning of education no longer dwells on the dictate. Turns into a social construction where technology makes schools for teacher and student interaction not only in a physical location but in a virtual form so that access can be done anywhere.

TABLE II.   WEB 1.0, 2.0 AND 3.0 GENERATIONS

	Web 1.0	Web 2.0	Web 3.0
Communication	Broadcast	Interactive	Engaged / Invested
Information	Static/Read-only	Dynamic	Portable & Personal
Focus	Organizaton	Community	Individual
Personel	Home Pages	Blogs/Wikis	Lifestreams
Contens	Ownership	Sharing	Curation
Interaction	Web Forms	Web Applications	Smart Application
Search	Drectories	Keywoords /tags	Context/Relavance
Metrics	Page Views	Cost Per Click	User Engagement
Adversiting	Banners	Interactive	Behavioral
Research	Britannica Online	Wikipedia	The Semantic Web
Technologies	HTML/FTP	Flash/jawa/XML	RDF / RDFS / OWL

In the field of education, changes in the paradigm and implementation of education develop along with technological developments. Taking an approach between education 2.0 and the generation of web 2.0, education in 2.0 can involve communication between teachers and students, students and students and students to content or experts. Some school administrators and educators build relationships as creativity tools such as the use of cooperative learning, Google classroom example, sharing on other wikis and social media.

However, most of the high schools in Ogan Ilir do not have the readiness to face this new era. This is the background of the research entitled Measuring schools readiness in industry 4.0 based on the school's web profile.

II. FORMULATION OF THE PROBLEM

Middle School readiness in entering Industry 4.0 can be seen from the use of technology where technology users involve external or public parties. One application that involves the public is the school website. The school web site has functions:

- Transparency of information to the public whether it is static, dynamic or personal

- Focus on the web whether on organization, community or personal

- As a virtual school environment whether communication is broadcast, interactive or engaged/invested

- Interaction between the school and stakeholders through web forms, web applications or smart applications.

III. METHODS

This type of research is field research conducted by 20 high schools in Kab. Ogan Ilir. Whereas in data collection techniques, researchers draw from primary data, that is, an object or original document, raw material from actors called "first-hand information".

To find out the web site profile, the steps are as follows:

1) Looking for data from the database related to school profiles, in this case the name of the school and the number of students
2) Researching school data included in Google My Business includes school addresses that can be traced via Google Map, contact telephone numbers and the existence of the school website
3) Visiting sites found through Google search facilities
4) Conducting web evaluations that are found to be in accordance with the generation of web characters include:
   - Communication model (broadcast, interactive, engage / invested),
   - The nature of information (static, dynamic, or portable / personal),
   - Web site focus (organization, community, or individual),
   - Content (ownership, sharing, accuration),
   - Interaction (web form, web application, smart application).
5) Measuring whether the website is responsive for web access through mobile equipment.

IV. RESEARCH RESULTS AND ANALYSIS

A. Sample Data

From searching Dapodik through http://dapo.dikdasmen.kemdikbud.go.id. Each sub-district is taken 1 high school and 1 vocational school. Selection of schools based on the highest number of students and greater than 300 students.

TABLE III.   SAMPLE DATA OF SMA / SMK IN OGAN ILIR

No	Sub-Districts	School Name	PD
1	Kec. Tanjung Raja	SMAN 1 TANJUNG RAJA	76
2	Kec. Tanjung Raja	SMK PGRI TANJUNG RAJA	124
3	Kec. Tanjung Batu	SMAN 1 TANJUNG BATU	54
4	Kec. Tanjung Batu	SMK AZZAWIYAH	31
5	Kec. Pemulutan	SMAN 1 PEMULUTAN	35
6	Kec. Pemulutan	SMKN 1 PEMULUTAN	41
7	Kec. Indralaya Utara	SMAN 1 INDRALAYA UTARA	33
8	Kec. Indralaya Utara	SMAN 1 INDRALAYA UTARA	52
9	Kec. Indralaya	SMAN 1 INDRALAYA	76
10	Kec. Indralaya	SMK LINGUA PRIMA	33
11	Kec. Indralaya selatan	SMAN 1 INDRALAYA SELATAN	40
12	Kec. Indralaya selatan	SMKN I INDRALAYA SELATAN	103
13	Kec. Pemulutan Selatan	SMAN 1 PEMULUTAN SELATAN	30
14	Kec. Rantau Panjang	SMAN RANTAU PANJANG	31
15	Kec. Payaraman	SMAN 1 PAYARAMAN	37
16	Kec. Sungai Pinang	SMAN 1 SUNGAI PINANG	34
17	Kec. Rantau Panjang	SMAN 1 RANTAU PANJANG	30
18	Kec. Kandis	SMAN 1 KANDIS	31
19	Kec. Pemulutan Barat	SMAN 1 PEEMULUTAN BARAT	33
20	Kec. Pemulutan Barat	SMK NURUL HUDA	42

B. Site Search Data

School Site Search through the Google search engine obtained the following date:

TABLE IV.   SITE SEARCH DATA

School Name	Web Address
SMAN 1 TANJUNG RAJA	Not found
SMK PGRI TANJUNG RAJA	www.smkpgri-tra.sch.id (not active)
SMAN 1 TANJUNG BATU	Not found
SMK AZZAWIYAH	Az-zawiyah.sch.id
SMAN 1 PEMULUTAN	https://sman1pemulutan.wordpress.com
SMKN 1 PEMULUTAN	Not found
SMAN 1 INDRALAYA UTARA	https://sman1indralayaselatan.sch.id
SMAN 1 INDRALAYA UTARA	https://www.smkn1layout.sch.id
SMAN 1 INDRALAYA	https://sman1indralaya.sch.id /(have problem)
SMK LINGUA PRIMA	There is no
SMAN 1 INDRALAYA SELATAN	http://sman1indralayaselatan.sch.id
SMKN I INDRALAYA SELATAN	Not found
SMAN 1 PEMULUTAN SELATAN	http://sman1pemulutanselatan.sch.id
SMAN 1 RANTAU PANJANG	Not found
SMAN 1 PAYARAMAN	http://sman1payaraman.sch.id
SMAN 1 SUNGAI PINANG	Not found
SMAN 1 RANTAU PANJANG	Not found
SMAN 1 KANDIS	Not found
SMAN 1 PEEMULUTAN BARAT	http://smansapb.mysch.id
SMK NURUL HUDA	Not found

From this table it can be concluded that as many as 50% of the number of high schools in Ogan Ilir do not yet have School Site this of course will affect the search for information about schools.

C. Google My Business

Google My Business data as follows:

TABLE V.   GOOGLE MY BUSINESS DATA

School Name	GMB
SMAN 1 TANJUNG RAJA	Maps, telephone
SMK PGRI TANJUNG RAJA	Maps, telephone, web (not active)
SMAN 1 TANJUNG BATU	Maps, telephone
SMK AZZAWIYAH	Maps, telephone
SMAN 1 PEMULUTAN	Maps, web
SMKN 1 PEMULUTAN	Maps
SMAN 1 INDRALAYA UTARA	Maps, web
SMAN 1 INDRALAYA UTARA	Maps
SMAN 1 INDRALAYA	Maps, the site (not active)
SMK LINGUA PRIMA	Maps, telephone
SMAN 1 INDRALAYA SELATAN	Maps, web
SMKN I INDRALAYA SELATAN	Maps
SMAN 1 PEMULUTAN SELATAN	Not Found
SMAN RANTAU PANJANG	Maps, telephone
SMAN 1 PAYARAMAN	Maps, web

TABLE V. Cont.

School Name	GMB
SMAN 1 SUNGAI PINANG	Maps
SMAN 1 RANTAU PANJANG	Maps
SMAN 1 KANDIS	Maps
SMAN 1 PEEMULUTAN BARAT	Maps
SMK NURUL HUDA	Maps

Of the 20 data obtained, as many as 19 schools have registered with Google My Business facilities and 1 has not been found. All registered on Google My Business register the location of the school so that it can be accessed via Google maps. A total of 4 schools registered the school web address at GMB. In conclusion, all schools that register for Google My Business rely on physical visits to school locations, as many as 6 schools or 32% of those registered at GMB register telephone numbers and only 20% register their web addresses for virtual visits.

From this result, it is seen that physical visits are still the main thing, followed by telephone communication. School sites can actually be built through free facilities such as from Google Site, but very few schools pay attention to virtual addresses.

D. High School / Vocational Web Evaluation Date

Search results with search engines using the keyword name of the school according to the name in Dapodik produce the following data:

1) Number of school webs found: 10 addresses, 8 active and 2 inactive

2) Details of web evaluations from the 8 active school web addresses are as follows:

- Of the 8 active web sites found, only 4 schools have updated information in 2019. This means that only 50% of active webs are managed until 2019

- Of the 8 webs found, only 1 web has links to internal e-learning

- Of the 8 webs found, only 4 webs uploaded PPDB 2019 announcements, 1 of which provided online registration facilities

- Of the 8 webs found, only 1 web has managed its own e-mail with names according to the official domain of the school.

3) Map of the condition of the school in Ogan Ilir based on research is as follows:

TABLE VI.   MAP OF THE CONDITION OF THE SCHOOL IN OGAN ILIR

Parameter	Web 1.0	Web 2.0	Web 3.0
Communication Model	87.5	12.5	0
Information System	0	87.5	12.5
Website Foucs	87.5	0	12.5
Content	100	0	0
Interaction	75	25	0
	70	25	5

From the active school web data, it can be seen that the readiness of SMA / SMK to enter the industry 4.0 is seen from the website profile:

- As many as 70% are still on the web 1.0 platform

- As many as 25% are on the web 2.0 platform

- And only 5% are ready to adapt to industry bar.

V. CONCLUSION

From the results of searching and evaluating high school / senior high school students in Ogan Ilir district, it can be concluded as follows:

- From a sample of 20 schools, 95% of schools were found

- Record sent to cyberspace through Google My Business. Most listed the physical school location and only 20% recorded their web address

- From Google search found as many as 8 schools that have an active website from 20 schools that were sampled

- Of the 8 active websites, only 50% did an update for 2019 (January-June 2019)

- E-learning was redefined by one of the web, but still not in accordance with the rules of e-learning. It still consists of links to the learning module, not links to the e-learning app

- PPDB which is public information, only 50% of the web is active

- SMA / SMK in Ogan Ilir is not ready to be moved with the industrial environment 4.0 seen from its website profile. Only 40% of the 20 Schools have an active website, and only 20% have updated information in 2019. As many as 70% still use and maintain the web as the web 1.0 era, 25% in web 2.0 contracts and only 5% have web principles 3.0.

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