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Can Google Experiments Turn into Educational Experiences?*

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Abstract

Google, which made a rapid entry into the lives of internet users with its search engine in 1998, has pioneered many technological innovations since then. Google, which sent most of the famous search engines of the 90s to the deep waters of history, once again attracted the attention of users with the maps application it released in 2005. Google, which reached people's pockets with the Android operating system in 2008, constantly helps its users with many more products. In this context, Google has many solution platforms for various users, companies and developers. Many tools such as Android, Search, Bard, Translation, Drawings, Documents, Drive, Spreadsheets, Earth, Finance, Forms are used for educational and academic purposes. This article examines whether Google experiments, in which web 3.0 and code writers exhibit various web technology experiences rather than a platform, can be an educational experience or not, using qualitative research methods. In this regard, a semi-structured checklist was created by the researcher aiming to reveal the education-technology relationship in Google Experiments. The findings show that Google Experiments mostly reflects achievements and skills, allows interaction, transactions can be made, transactions can often be shared with stakeholders, and content can be presented through experiments in learning environments.

Keywords: Acquisition, skills, Google experiments, education

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Today, the introductory or contextual sentences of scientific studies mostly refer to "technology" and "technological developments". Indeed, human beings have been making their lives easier with technology since their existence. However, unlike previous periods, in the century we live in, technology is spreading to every aspect of life. In the future, there are already many examples of a common life with technology.

Above, the relationship between technology and human beings in various periods is briefly expressed. Of course, people and manpower are involved in this eager progress of technology. However, the era of digitalization, which is based on electrical signals, paves the way for the emergence of very large companies. In this process, which is headquartered in the United States, computer companies such as Apple, Atari, Hewlett-Packard, Packard Bell, Comodo, Compaq, IBM, Intel, Dell, Oracle as well as internet giants such as Akamai Technologies, Alphabet, Meta, Foursquare, Microsoft and EBay were also involved. There are. Google, an American multinational company, operates in California. Following the launch of the search engine that searches with a different strategy in 1998, Google today offers dozens of functional tools and platforms to its users.

Google was founded by Larry Page and Sergey Brin. They develop global internet-based tools and products through Google, which they founded in 1998 while doing their doctorate at Stanford University. The motto of Google, which has been the most visited website in the world for a long time, is "to organize the world's information and make it accessible and useful to everyone" (URL 1_ 2023). In this context, Google offers a wide range of functional tools to its users. Some of these appeal to normal users, some to businesses, and some to developers. However, regardless of the category, Google offers many internet-based products for educators, learners, enthusiasts and scientists. In this study, the tools in a workshop called Google Experiments by Google are examined from an educational perspective. In determining such a problem situation of the study, Google Experiments is defined as a digital workshop with advanced web technology.

Google Experiments

Products developed by Google are mostly web-based. For this reason, web technologies, starting from version 1.0 and reaching version 3.0 today, now have a semantic structure. In version 2.0, web technologies that focus on interaction thus welcome their users with extraordinary experiences. In this context, the digital workshop, which includes extraordinary experiences created by coders, was launched by Google. This digital workshop, referred to as Google Experiments, is defined as follows (URL 2, 2023):

> *"Chrome Experiments is a platform to showcase the work of coders who push the boundaries of web technology and create beautiful and unique web experiences. You can find helpful links on the site to create your own experiments, and you can also explore our workshop with WebGL Globe and our tools."*

Based on the definition above, it can be understood that Chrome Experiments contains the most extraordinary web pages and even web developers can access helpful resources in creating their own works. The mentioned WebGL Globe consists of the combination of WebGL + Globe concepts. WebGL (Web Graphics Library) is a standard for creating three-dimensional graphics in internet browsers. WebGL Globe, on the other hand, is developed to visualize geographical data on a three-dimensional geoid. Therefore, thanks to WebGL Globe, the world map can be displayed in three dimensions. This helps make geographical data understandable.

As of September 2023, 1613 experiments are indexed in Google Experiments. TensorFlow Lite for Microcontrollers, Experiments for Learning, AI + Writing, Start With One, Heartbeat of the Earth, Inside Guide, Creatability, Digital Wellbeing Experiments, Hello Morse, WebXR Experiments, Voice Experiments, Arts & Culture Experiments, AR Experiments, AI Experiments The experiments, which are placed under seventeen categories under the titles: , Web VR Experiments, Android Experiments, Chrome Experiments, offer quite extraordinary experiences. When the studies are examined, it is seen that they created extraordinary experiments using the Chrome web browser, Android operating system, AI, AR and other technologies (URL 3). At this point, the possibility of using Google Experiments, which is thought to be used in all kinds of new web technologies, in terms of education is a big problem that needs to be investigated. In the context of this main problem, the study seeks answers to the following sub-problems through the "Experiments for Learning" category.

1) What are the levels of reflection of achievements and skills?
2) What is the level of interaction creation functions?
3) What is their transaction ability?
4) Can transactions be shared with stakeholders?
5) Can the relevant experiment be used in line with the content?

Method

Research Model

Qualitative research approaches were used in the study. In the study carried out from an interdisciplinary perspective, a case study was conducted to find rich answers that could explain the problem situation (Yıldırım and Şimşek, 2013:83).

Data Source

The data source of the study was Google Experiments under the category of Experiments for Learning accessed from the URL https://experiments.withgoogle.com/collections. It was observed that there were thirty-three different experiments under different disciplines in September 2023. Descriptions of these are given in Table 1.

Table 1

Tools That Constitute the Data Source

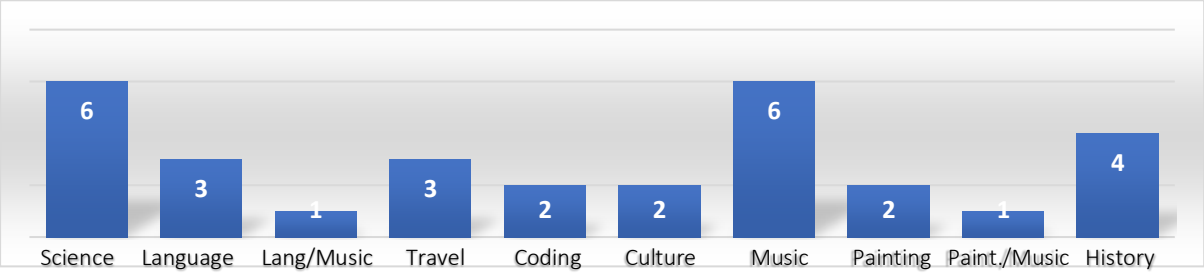
Code	Experiment	Discipline
Exp_1	Access Mars	Science
Exp_2	Pattern Radio: Whale Songs	Science
Exp_3	Bird Sounds	Science
Exp_4	Nasa's Visual Universe	Science
Exp_5	A Spacecraft for All	Science
Exp_6	Bing Bang AR	Science
Exp_7	Thing Translator	Language
Exp_8	Morse Typing Trainer for GBoard	Language
Exp_9	Visual Crosswords	Language
Exp_10	Word Synth	Language/Music
Exp_11	Chauvet: The Dawn of Art	Travel
Exp_12	Bagan	Travel
Exp_13	Hopper The Penguin Explorer	Travel
Exp_14	Teachable Machine	Coding
Exp_15	Tiny Sorter	Coding

Exp_16	What Came First?	Culture
Exp_17	Cultural Crosswords	Culture
Exp_18	Radio Garden	Music
Exp_19	Chrome Music Lab: Song Maker	Music
Exp_20	Assisted Melody	Music
Exp_21	Semi-Conductor	Music
Exp_22	Seeing Music	Music
Exp_23	Blob Opera	Music
Exp_24	Quick, Draw!	Painting
Exp_25	Autodraw	Painting
Exp_26	Paint with Music	Painting/Music
Exp_27	Notable Women	History
Exp_28	My Story Time	History
Exp_29	Fabricus	History
Exp_30	The Museum of the World	History

The distribution of the tools that constitute the data source according to disciplines is given in Figure 1.

Figure 1

Tools By Discipline Areas



Data Collection Tools

In order to analyze the experiments that constitute the data source of the study, a checklist (DTKL) covering the five main principles of the Du-TE model was created. The Du-TE model was developed by Hur, Cullen, and Brush (2010) and is based on situational learning and cognitive apprenticeship techniques. The Du-TE model was developed to enable learners who model the process through cognitive apprenticeship and practice in real situations through situational learning to construct meaningful technology knowledge (Kaya & Yılayaz, 2013). Accordingly, for meaningful technology knowledge acquisition;

- It should create concrete experiences,
- Information must be reflected,
- Implementation support should be provided,
- A community of learners should be created and encouraged,
- TBAP (Technological Pedagogical Content Knowledge) should be created.

The parameters in the DTKL created according to the above criteria are as follows:

- Reflection of achievements and skills,
- Interaction building functions,
- Ability to make transactions,

- Ability to share transactions with stakeholders,
- The relevant experiment can be used in line with the content.

With these parameters given in DTKL, the studies in Google Experiments were analyzed. Thus, the descriptive themes of the study were also determined.

Data Collection

The data of the study were accessed from Experiments with Google. By utilizing the classification made by Google, the relevant experiments were directly accessed and these were directly accepted as the data source of the study.

Analysis of Data

Thirty-one studies were evaluated with DTKL to carry out the situation analysis of the study. In this context, the themes of DTKL were taken as basis for descriptive analysis. Thus, the findings were obtained by performing descriptive analysis according to the studies' ability to reflect achievements and skills, to create interaction, to be able to perform transactions, to share transactions with stakeholders, and to use the relevant experiment in line with the content.

Reliability and Validity of Data

In the study, the pedagogical context of the data source was classified first by Google and then independently by the researcher. Afterwards, the results of this classification were presented to the opinions of two field experts. After it was decided that the final data source should not be changed, the researcher consulted the opinions of two field experts to standardize the reliability of the data obtained with DTKL. In this context, the opinions obtained, and the researcher's findings were tested with the reliability calculation of Miles and Huberman (1994) and it was seen that the findings were 96% similar. This result is considered reliable (Miles and Huberman, 1994).

Results

The findings obtained within the scope of the study are interpreted and presented in tables below.

Findings Regarding the Level of Reflection of Acquisitions and Skills

The findings and explanations regarding whether the examined Google Experiments reflect achievements and skills are as follows (Table 2).

Table 2

How Google Experiments Reflect Achievements and Skills

Mirroring Status	Experiment	
Positive	Exp_1, Exp_2, Exp_3, Exp_4, Exp_5, Exp_6, Exp_8, Exp_11, Exp_12, Exp_14, Exp_16, Exp_23, Exp_24, Exp_25, Exp_27, Exp_28, Exp_29, Exp_30	
	Total	**18**
Annoyed	Exp_7, Exp_9, Exp_10, Exp_13, Exp_15, Exp_17, Exp_18, Exp_19, Exp_20, Exp_21, Exp_22, Exp_26	
	Total	**12**

When Table 2 is examined, it is seen that the reflection of Google Experiments on achievements and skills is mostly positive (f = 18), while some of them are limited (f = 12). However, during the analysis, it was understood that the experiments, which were considered

to be limited in reflecting achievements and skills, were tools for use rather than reflecting these.

Findings Regarding the Interaction Creation Function

The findings and explanations regarding the interaction function of the examined Google Experiments are as follows (Table 3).

Table 3
How Google Experiments Reflect the Interaction Function

Interaction Function	Experiment	
Positive	Exp_1, Exp_2, Exp_3, Exp_4, Exp_5, Exp_6, Exp_7, Exp_8, Exp_9, Exp_10 Exp_11, Exp_12, Exp_13, Exp_14, Exp_15, Exp_16, Exp_17, Exp_18, Exp_19, Exp_20, Exp_21, Exp_22 Exp_23, Exp_24, Exp_25, Exp_26, Exp_27, Exp_28, Exp_29, Exp_30	
	Total	**30**

When Table 3 is examined, it can be seen that the interaction function of Google Experiments is completely positive (f = 30). This can be explained by the fact that the experiments are related to Web 2.0 and later versions.

Findings Regarding Transaction Skills

The findings and explanations regarding the ability to perform operations in the examined Google Experiments are as follows (Table 4).

Table 4
Google Experiments Reflect the Ability to Perform Operations

Trading Function	Experiment	
Positive	Exp_1, Exp_2, Exp_3, Exp_4, Exp_5, Exp_6, Exp_7, Exp_8, Exp_9, Exp_10 Exp_11, Exp_12, Exp_13, Exp_14, Exp_15, Exp_16, Exp_17, Exp_18, Exp_19, Exp_20, Exp_21, Exp_22 Exp_23, Exp_24, Exp_25, Exp_26, Exp_27, Exp_28, Exp_29, Exp_30	
	Total	**30**

When Table 4 is examined, it is seen that the ability to perform operations in Google Experiments is completely positive (f= 30). This can be explained by the fact that the structure of Google Experiments is related to Web 2.0 and later versions.

Findings on Sharing Transactions with Stakeholders

The findings and explanations regarding the ability to share transactions with stakeholders in the examined Google Experiments are as follows (Table 5).

Table 5
Reflection of Google Experiments to Share Processes with Stakeholders

Trading Function	Experiment	
Positive	Exp_2, Exp_4, Exp_6, Exp_13, Exp_14, Exp_15, Exp_19, Exp_20, Exp_21, Exp_23, Exp_25, Exp_26, Exp27, Exp_28, Exp_29, Exp_30	
	Total	**16**
Negative	Exp_1, Exp_3, Exp_5, Exp_7, Exp_8, Exp_9, Exp_10, Exp_11, Exp_12, Exp_16, Exp_17, Exp_18, Exp_22, Exp_24	

	Total	**14**

When Table 5 is examined, it is seen that some of the ability to share transactions with stakeholders in Google Experiments is positive (f = 16) and some is negative (f = 14). This is explained by the fact that some of the Google Experiments do not have functions such as saving, downloading, or uploading to the cloud.

Findings Regarding the Usability of the Related Experiment

The findings and explanations regarding the use of the relevant experiment in line with the content in the Google Experiments examined are as follows (Table 6).

Table 6

Ability To Use the Relevant Experiment In Line With The Content In Google Experiments

Interaction Function	Experiment	
Positive	Exp_1, Exp_2, Exp_3, Exp_4, Exp_5, Exp_6, Exp_7, Exp_8, Exp_9, Exp_10 Exp_11, Exp_12, Exp_13, Exp_14, Exp_15, Exp_16, Exp_17, Exp_18, Exp_19, Exp_20, Exp_21, Exp_22 Exp_23, Exp_24, Exp_25, Exp_26, Exp_27, Exp_28, Exp_29, Exp_30	
	Total	**30**

When Table 6 is examined, it is seen that all relevant experiments (f= 30) can be used in Google Experiments in line with the content. This supports the existence of an educational dimension to the experiments.

Conclusion

In this study, the tools in the educational category of Google Experiments were examined in terms of reflecting the achievements and skills, interaction functions, ability to perform operations, sharing the transactions with stakeholders and using the relevant experiment in line with the content. In the study carried out with qualitative approaches, the current situation was determined and presented in paragraphs below. The tools in the educational category of Google Experiments mostly reflect the achievements and skills in their content. Since some of the tools allow use based on achievements and skills, the reflection function is limited. Tools in the educational category of Google Experiments allow interaction. This situation is explained by the web 2.0 and later versions of the tools. Therefore, the tools are ready for interaction and semantic structure. Tools in the educational category of Google Experiments allow manipulation on them. This situation is explained by the web versions of the tools, as in the previous article. Therefore, it is understood that the tools are ready for interaction and semantic structure. Operations performed in the tools in the educational category of Google Experiments can often be shared with stakeholders. However, some of the tools do not allow sharing with stakeholders. This is related to the fact that the vehicles do not have the ability to save, download, continue and cloud technology infrastructure. The content of all tools in the educational category of Google Experiments can be used with experiments in learning environments. This shows that the tools are used entirely for educational purposes.

- Within the scope of Google Experiments, educators and software developers come together in virtual and real environments and become stakeholders for new tools,
- Creating awareness in teacher training institutions for Google Experiments tools,
- It is recommended to raise awareness among teachers working with Google Experiments tools

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