

## Improving Student Capabilities through Research-Based Learning Innovation on E-Learning System

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**Abstract**—A current higher education curriculum has shifted from a training and professional development model to a capability development model, from work-oriented to a life orientation, from a teaching paradigm to a learning paradigm. The logical consequence of this shift requires innovation not only in the form of instruments and digitization of learning but also in learning innovation in the learning process and student learning experiences. This study aims to design learning innovations using research-based learning models that are integrated through e-learning to improve student capabilities. This study used research and development method with a 4-D model. This study found that there was an increase in the quality of learning in social studies learning courses and an increase in student capabilities through a research-based learning approach implemented through the e-learning system.

**Keywords**—Innovation, research-based learning, e-learning, student capabilities.

### 1 Introduction

Today's technology has changed the way humans live and work [1] and has significantly shifted the traditional educational paradigm towards the internet of things [2]–[4]. Technological advances also bring the world to an era where all life processes can be carried out online, including in the teaching process and the learning strategy process. In short, today's digital literacy is an inseparable part of modern human life [5], [6].

E-learning, as an electronic media in learning, has become the choice of universities in the world [7]. Some literature empirically indicates that the use of e-learning as a learning medium has been proven to be effective in increasing motivation and learning outcomes [8], [9]. The use of e-learning can not only overcome the problem of high numbers of students but also can significantly assist instructors in providing effortless and efficient access to the learning process [10], [11].

E-learning is an essential part of learning media in Indonesia, especially at Universitas Negeri Malang [12]. The curriculum at Universitas Negeri Malang since 2018 has experienced a shift from an expert learning approach to a life-based learning approach, from training and professional development models to capacity development

models, from work-oriented to life-oriented, from a teaching paradigm shifted to a learning paradigm. This approach also has implications for various approaches and learning processes applied.

Learning activities in life-based learning are implemented through several characteristics such as challenging learning including improving thinking skills and social skills, authentic, everyday experiences, integrative, interdisciplinary, and transdisciplinary, learning more flexible, dynamic, and responsive including serving the diversity of students, expand learning vehicle. Also, life-based learning activities refer to integrated assessments in learning which include measuring performance and focusing on learning progress. Furthermore, in a life-based learning approach, students are seen as organisms and sources of knowledge, producing knowledge and ability to be actively involved emotionally in authentic and collaborative learning. Life-based learning also positions lecturers as educators and facilitators as stylists of the learning environment, as mentors who can do mediation and modelling, and as collaborators or learning partners who can work together with students to solve problems.

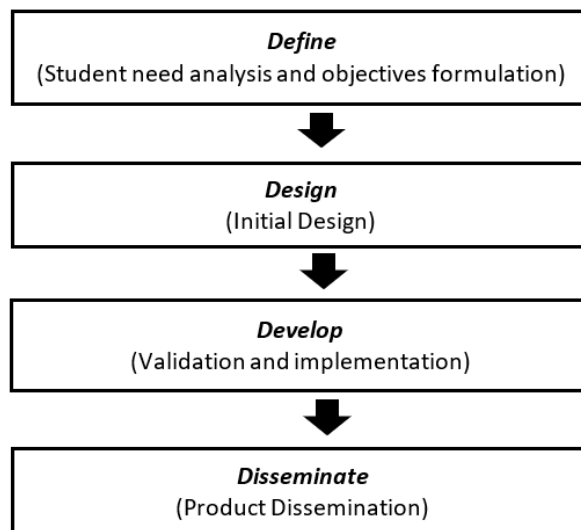
The formation of capabilities as learning objectives is demonstrated by the ability of competence, skillful, multitasking, which can do effectively, able to do anything and overcome the problems of new life. In addition, capability also means high creativity and self-efficacy. Thus, capability means the extent to which a person can build his competence [12]. To support this goal, it is necessary to develop research-based learning innovations by integrating research into the learning process. This research-based learning is multifaceted, using a variety of learning methods such as authentic learning, problem-solving, cooperative learning, contextual, and inquiry discovery approach based on the philosophy of constructivism [13].

The first stages in research-based learning are exposure, which is the stage of building students' knowledge from various disciplines by studying literature, developing analytical and technical skills. The second is the experience phase, providing experience by conducting research. The last stage is the capstone, presenting research results verbally and in writing. At this last stage, students prepare a final project with the characteristics of experience during learning and research as a project appearance, presentation of written and oral results, and scientific publications [13].

According to Arifin [14], the benefits of research-based learning include; first, students have a strong understanding of basic concepts and methodologies, can solve problems creatively, logically, and systematically. Second, students have a scientific attitude, always looking for the truth, open, and honest. Third, students have competent communication, technical and analytical skills to adapt, work in groups, and be able to compete. Fourth, students gain the development and improvement of capabilities and higher competencies. Fifth, students have high learning motivation and have opportunities to be active in the learning process related to the world of practice in the future. Finally, students are trained in the values of discipline, gain practical experience and ethics. Thus, this study intends to design learning innovations by using research-based learning models that are integrated with e-learning to improve student capabilities.

## 2 Method

This study used research and development methods with 4-D models. This model consists of four stages consisting of define, design, develop, and disseminate [15]. This model was chosen based on its suitability to the development needs. Product development design is based on lecture design with a research-based learning model. The lecture design is detailed in the semester lecture design. Furthermore, the design is integrated with online classes on [sipejar.um.ac.id](http://sipejar.um.ac.id). This online class is used as a guide for implementing the learning flow, discussion, assignments, and access to various learning resources. The principle of online classroom learning activities can be processed synchronously and asynchronously. Synchronous means online in real-time. Asynchronous refers to online classes at different times [12]. The subject chosen in this development is the Social Studies learning strategy course in the social studies program, faculty of social science, Universitas Negeri Malang. Data were collected using observations and questionnaires. Furthermore, the stages of product development use the 4-D model as shown below.



**Fig. 1.** Research design by 4-D Model

The 4-D model starts from the define stage as the initial stage, which includes a student needs analysis and setting learning objectives. The design phase refers to the initial design and preparation of learning synopsis. Furthermore, the develop phase or initial design trial stage is by expert validation and revision. Next, the product is tested by involving all students for the Social Studies learning strategy course. The last stage is disseminate, the stage of product distribution which has been successfully made on a broader scope.

### **3 Results and Discussions**

#### **3.1 Define**

This stage aims to establish and define the conditions needed in the development of research-based learning through e-learning systems. This defining stage is the initial stage which includes the analysis of students, and the final goal is to set learning objectives. This stage begins with the activity of analyzing the gaps that occur between what is learned in class and facts in the field. The facts in the field (the results of observations and interviews) show that there are several problems inherent in students. They claimed to be bored and fed up if the delivery method in learning only uses lectures and presentations. They feel bored because most courses always present. In addition, when they are asked if there are questions, they tend to be passive. When they were asked, most of them were confused in answering. It shows that the ability of students in making questions tends to be low. There are some students who claim to often lack concentration when explained material, and they prefer to practice outside the classroom.

The analysis is used to identify solutions that can be used to overcome learning problems and formulate learning goals. One solution that can be offered is by applying research-based learning. The developer tries to vary a variety of models such as problem-based learning, inquiry, discovery, and methods such as discussion, question and answer, observation in research. By applying research in learning, it is expected to increase the capabilities of students as the objectives in the curriculum. The objective indicators include: 1) students have a strong understanding of basic concepts and methodologies; can solve real problems creatively, logically and systematically; 2) students have the opportunity to actively develop critical ideas, logically creative in problem-solving; 3) students can build new competencies; 4) student learning independence increases.

#### **3.2 Design**

After the learning objectives are formulated, the next step is to design research-based learning through e-learning. The steps of the research-based learning model through the e-learning system. First is exposure or knowledge building. To build student knowledge, the learning step is to provide some initial information about learning strategies with face-to-face and online methods through e-learning (sipejar.um.ac.id). The following figure 2 and 3 are pictures of developed homepage e-learning and sample image of e-learning content consisting of various features, such as discussion forums, assignments, worksheets, materials, where each meeting is designed according to the syntax requirements of the research learning model.



Fig. 2. Homepage of Social studies learning strategy course

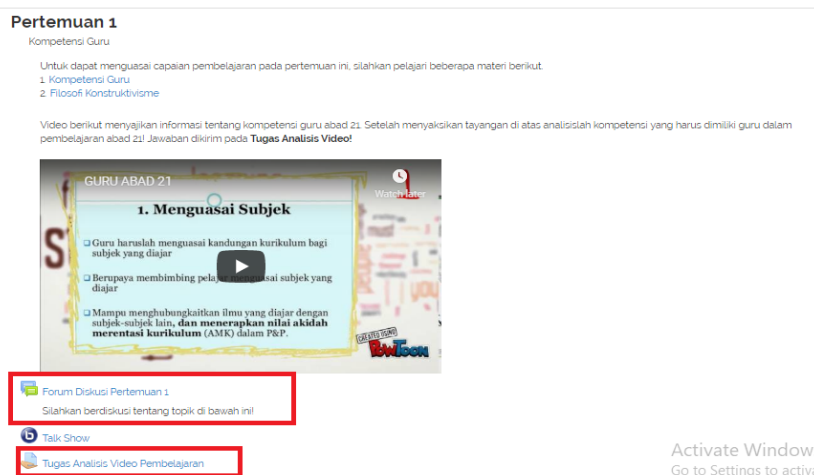


Fig. 3. Knowledge building through videos, forums, and tasks

The second step is experience, providing research experience to students. Students are divided into groups; each group observes in the field such as schools. The focus of this observation is on the implementation of learning. Then, they formulate the problems found based on observations and try to design or compile a formula in the form of appropriate learning strategies to overcome the problems that have been found. Strategic preparation is carried out with collaboration between lecturers and students, lecturers acting as facilitators. After the design is finished, the next step is to experiment or test the strategy in class. At this stage, each group has conducted research even on a small scale. The final step is capstone, presenting research results. Presentation of research results do not have to be in the form of reports, but can also be in the form of videos, posters, and products.

### 3.3 Develop

Activities at the develop stage are expert validation, revision and testing. Validation is an attempt to obtain academic recognition. Validation is done through a test of

the validity of the content, construct, and technical language of the model. Validation involves learning design experts and media experts. Both validators provide input and evaluation to improve this learning model.

Validation of this learning model aims to determine the validity of research-based learning models, especially on the suitability of the learning steps and tools with concepts and theories. The learning design expert validator is Dra. Hj. Siti Malikhah Towaf, M.A., Ph. D. He is a social studies program lecturer whose primary focus of research is the planning, implementation and evaluation of social studies learning. Thus, he is eligible to provide input and evaluation of this learning model.

Based on the results of validation, substantially, the research-based learning model in this study is considered an interactive learning model and can stimulate students to collaborate, think critically, and be creative. Therefore, this learning model is believed to be applicable in learning. However, there are still several things that need to be completed and explained in the process of implementing this model to avoid misunderstandings in giving meaning and interpretation to the substance of the model. Although this model applies research in learning, the scale of the research is still relatively small or known as mini-research. This means that students will be introduced to research in this learning.

Learning design expert responses to the development of research learning models are first, the learning objectives to be achieved in each meeting must be measurable and under the curriculum, development of student capabilities. Second, the steps or design of research learning model activities need to be clarified or operationalized. Third, after the research development of research-based learning model is completed, in the future it would be better to be followed up with the development of guidelines for the implementation of research learning models as a guide in promoting research learning models for educators and students.

The media expert validator was Ulfatun Nafi'ah, M.Pd. He is a lecturer in the Department of History whose research is on learning media. The learning media used in this study is the use of online classes on the page [sipejar.um.ac.id](http://sipejar.um.ac.id). or often referred to as the utilization of Learning Management System (LMS). Development of LMS with open online learning, able to offer a means to connect thousands of students doing various learning activities to achieve more effective learning [16]. E-Learning is not only considered as a training medium, but can also be used as a learning strategy [17], or learning environment [18].

According to the validator, in general, learning media and learning facilities in the form of e-learning are effective and efficient for learning today. The existence of material, videos, discussion forums, and other learning resources contained in e-learning makes it easy for learning to be carried out anytime, anywhere, and by anyone [1], [6], [19]. This integrated design of online learning activities supports the implementation of research learning models. However, there are suggestions given by experts, first, the video embedded in e-learning is only 8-10 minutes long to be more effective. Second, the command sentence or appeal used in giving assignments or forums in e-learning must be straightforward and clear. Third, learning resources need to be enriched with the latest references.

The next activity, after receiving advice and input from the two validators, the researcher made a revision. The following is the validator's final evaluation data after the learning model has been improved. Based on the average results, it is concluded that the research learning model through e-learning is valid and feasible to be applied in the learning process, ranging from 86% to 92% for the level of achievement. They also clarified this learning model as qualified and no revision.

**Table 1.** The result of Expert validation

Information	Level of Achievement (%)	Inf.	Suggestions
The result of validation from learning design expert	86%	Qualified	No revision
The result of validation from learning media expert	92%	Qualified	No revision
Average of Percentages (%)	89%	Qualified	No revision

The next step is implementation or testing. This stage involved 38 social studies program students, faculty of social science, Universitas Negeri Malang who were taking social studies learning strategy courses in 2018/2019. The product tested was the application of a research-based learning model based on e-learning systems. Although integrated with e-learning, the principle of learning activities in this study refers to three phases such as face-to-face (offline); synchronous and asynchronous class (online). The final stage of this implementation, students are asked to provide an assessment of the feasibility of the learning model that was developed as well as what learning experiences gained after participating in the application of a research-based learning model.

The implementation of learning with research-based learning models through e-learning is exposure, building student knowledge from various disciplines by utilizing various learning resources that have been designed in e-learning ([sipejar.um.ac.id](http://sipejar.um.ac.id)). This stage is implemented at meetings 1-4 through offline and online methods. The second step is experience, providing research experience to students. This stage is implemented in meetings 5-7. Students make observations and research in schools to find social studies learning problems and analyze these problems. Although there are no face-to-face meetings, each group is required to conduct consultations with lecturers related to the progress of findings in the field by uploading progress reports and being active in discussion forums provided on the [sipejar.um.ac.id](http://sipejar.um.ac.id) page. After analyzing the data, the next step at the 8-10 meeting of students is to develop an appropriate learning strategy to solve the problems and challenges encountered in the field.

The 11-13th meeting, students present learning strategies in class (face-to-face learning activities), to get some input from lecturers and other friends to design learning strategies. In addition, before practicing in a real class, students need to communicate the design strategies that have been planned to the tutor at school. This meeting was followed up by students by preparing learning tools and media that would be used for practice in schools. In the 14th meeting, students practiced the learning strategies that had been designed at school and recorded the implementation of learning in the form of videos. Furthermore, at the 15th meeting, discussion students compiled reports on their practice results and collected the results of reports using synchronous and asynchronous online methods on [sipejar.um.ac.id](http://sipejar.um.ac.id). The final step is capstone,

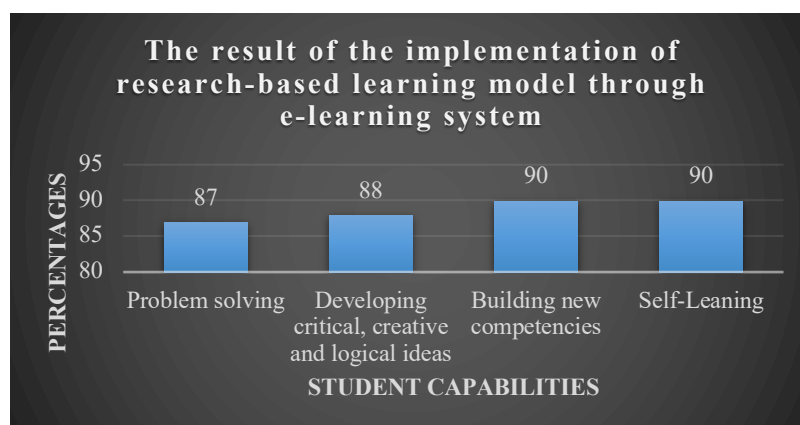
presenting research results. This presentation is in the form of reports, posters, and videos of the implementation of learning strategies

After all stages of the research-based learning model are completed, at the end of the learning session students are asked to write an assessment of the implementation of this learning model through a questionnaire. The following are the results of students' assessment of research models based on research through e-learning. The assessment covers 3 aspects including the advantages and disadvantages of research learning models through e-learning and benefits for students from research learning models through e-learning.

The results of student responses to the benefits of applying research learning models through e-learning are as follows.

**Table 2.** Students responses to e-learning usage

Aspects	A	B	C	D	Averages
Student Capabilities	Problem solving	Developing critical, creative, and logical ideas	Building new competencies	Self-Learning	
Percentage	87	88	90	90	88,8



**Fig. 4.** The result of the implementation of research-based learning model through e-learning system

The benefits of applying a research-based learning model through e-learning for students, in general, can increase student capabilities. This is demonstrated by their ability to solve real problems, being able to develop critical, creative and logical ideas, being able to make decisions, being able to build new competencies, and being able to learn independently. The findings of this study support Hidayah [20] and Susiani et al. [21] who found that research-based learning can improve students' critical and creative thinking. In addition, other findings show that research-based learning is a fun learning model [9].

The advantages of research-based learning models through e-learning include easy to apply, effective, and efficient. The learning process using ICT-based and open-access media such as e-learning, moodle, VMseet, and others have proven to be flexi-



ble to be applied and are believed to help the efficiency of the learning process [22]. At a broader level, online learning has been widely operated because it has proven to be effective as a form of learning service [3], [4], [23], [24].

### **3.4 Disseminate**

The activities carried out at this stage are product dissemination in the form of a research-based learning model integrated with e-learning to lecturers through seminars. Seminar participants who attended the event were 32 lecturers from the Faculty of Social Sciences, Universitas Negeri Malang. After the socialization through the seminar, the final step of this development is the publication of the results in the form of articles to scientific journals.

## **4 Conclusion**

The research-based learning model through e-learning provides opportunities for students to explore their potential in adjusting to their needs and providing the experience needed for their lives in the future. In addition, the integrative learning process through e-learning and with a research-based approach offers an effective, efficient learning strategy, and is able to improve the capabilities of students in dealing with real life. By this capability, they will be able to adapt to the demands and challenges of work in the future.

## **5 References**

- [1] K. H. Lau, T. Lam, B. H. Kam, M. Nkhoma, J. Richardson, and S. Thomas, "The role of textbook learning resources in e-learning: A taxonomic study," *Comput. Educ.*, vol. 118, pp. 10–24, Mar. 2018. <https://doi.org/10.1016/j.compedu.2017.11.005>
- [2] I. U. Khan, Z. Hameed, Y. Yu, T. Islam, Z. Sheikh, and S. U. Khan, "Predicting the acceptance of MOOCs in a developing country: Application of task-technology fit model, social motivation, and self-determination theory," *Telemat. Inform.* vol. 35, no. 4, pp. 964–978, Jul. 2018. <https://doi.org/10.1016/j.tele.2017.09.009>
- [3] B. Kurniawan, I. Idris, A. Purnomo, A. Wiradimadja, and S. Sukanto, "Using Broadcasting Learning Design to Enhance Student's Experiential Skill," *Int. J. Emerg. Technol. Learn. IJET*, vol. 14, no. 16, pp. 172–180, Aug. 2019. <https://doi.org/10.3991/ijet.v14i16.10652>
- [4] W. D. Sulisty, U. Nafi'ah, and I. Idris, "The Development of E-PAS Based on Massive Open Online Courses (MOOC) on Local History Materials," *Int. J. Emerg. Technol. Learn. IJET*, vol. 14, no. 09, p. 119, May 2019. <https://doi.org/10.3991/ijet.v14i09.10143>
- [5] K. R. Adi, I. Idris, and F. Rosyida, "Game quiz dalam kegiatan lesson study sebagai penggugah minat belajar Mahasiswa," in *SEMNAS IPS 2018, Malang, 2018*, pp. 72–78.
- [6] N. Sudarwati and \_Rukminingsih, "Evaluating E-Learning as a Learning Media: A Case of Entrepreneurship E-Learning Using Schoology as Media," *Int. J. Emerg. Technol. Learn. IJET*, vol. 13, no. 09, p. 269, Sep. 2018. <https://doi.org/10.3991/ijet.v13i09.7783>

- [7] S. Abou El-Seoud, N. Seddiek, I. Taj-Eddin, P. Ghenghesh, A. Nosseir, and M. El-Khouly, "E-Learning and Students' Motivation: A Research Study on the Effect of E-Learning on Higher Education," *Int. J. Emerg. Technol. Learn. IJET*, vol. 9, no. 4, p. 20, Jun. 2014. <https://doi.org/10.3991/ijet.v9i4.3465>
- [8] I. M. Romi, "A Model for e-Learning System Success: Systems, Determinants, and Performance," *Int. J. Emerg. Technol. Learn. IJET*, vol. 12, no. 10, pp. 4–20, 2017. <https://doi.org/10.3991/ijet.v12i10.6680>
- [9] M. S. Sumbawati and Y. Anistiyasari, "The impact of research-based learning on student's academic performance and motivation," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 296, p. 012043, Jan. 2018. <https://doi.org/10.1088/1757-899x/296/1/012043>
- [10] M. Abbad and F. Jaber, "Evaluating E-Learning Systems: An Empirical Investigation on Students' Perception in Higher Education Area," *Int. J. Emerg. Technol. Learn. IJET*, vol. 9, no. 4, p. 27, Jun. 2014. <https://doi.org/10.3991/ijet.v9i4.3480>
- [11] I. K. Suartama, P. Setyosari, S. Sulthoni, and S. Ulfa, "Development of an Instructional Design Model for Mobile Blended Learning in Higher Education," *Int. J. Emerg. Technol. Learn. IJET*, vol. 14, no. 16, p. 4, Aug. 2019. <https://doi.org/10.3991/ijet.v14i16.10633>
- [12] A. Rofiuiddin, *Menginovasi Pendidikan Tinggi: Kurikulum Transdisipliner dan Belajar Berbasis Kehidupan*. Malang: UM Press, 2017.
- [13] D. T. Widayati et al., *Pedoman Umum Pembelajaran Berbasis Riset (PUPBR)*. Yogyakarta: UGM Press, 2010.
- [14] P. Arifin, "Research Based Learning," in *Symposium*, Solo, 2010.
- [15] S. Thiagarajan, D. S. Semmel, and M. I. Semmel, *Instructional Development for Training Teacher of Exceptional Children*. Minnesota: Indiana University, 1974.
- [16] H. Praherdhiono, E. P. Adi, and Y. Prihatmoko, "Konstruksi demokrasi belajar berbasis kehidupan pada implementasi LMS dan MOOC," *Edcomtech*, vol. 3, no. 1, pp. 21–28, 2018.
- [17] J. R. D. Burgess and J. E. A. Russell, "The effectiveness of distance learning initiatives in organizations," *J. Vocat. Behav.*, vol. 63, no. 2, pp. 289–303, Oct. 2003.
- [18] R. E. Derouin, B. A. Fritzsche, and E. Salas, "E-Learning in Organizations," *J. Manag.*, vol. 31, no. 6, pp. 920–940, Dec. 2005.
- [19] Y. Yulita, "Pengembangan E-Learning Menggunakan Chamilo Untuk Membantu Proses Pembelajaran Fisika SMA Kelas X Semester II," *Gravity J. Ilm. Penelit. Dan Pembelajaran Fis.*, vol. 4, no. 2, pp. 15–25, 2018. <https://doi.org/10.30870/gravity.v4i2.4029>
- [20] R. Hidayah, "Implementasi research based learning pada mata kuliah Media Pembelajaran: Penelitian kelas pada mahasiswa calon guru SD," *J. Bid. Pendidik. Dasar*, vol. 2, no. 2, pp. 53–61, Aug. 2018. <https://doi.org/10.21067/jbpd.v2i2.2307>
- [21] T. S. Susiani, M. Salimi, and R. Hidayah, "Research Based Learning (RBL): How to Improve Critical Thinking Skills?" *SHS Web Conf.*, vol. 42, pp. 1–6, 2018. <https://doi.org/10.1051/shsconf/20184200042>
- [22] S. Hanief, "Pengukuran Efektivitas Pembelajaran Jarak Jauh Menggunakan Framework Cobit 4.1 Dengan Pola Sinkronus," in *Prosiding Seminar Nasional Sistem & Informatika 2015*, Bali, 2015, pp. 967–972.
- [23] E. Hartati, "Analisis sistem penerapan e-learning dengan menggunakan metode UTAUT (Unified theory of acceptance use of technology)," *J. Ilm. Inform. Glob.*, vol. 8, no. 1, pp. 13–18, 2017.
- [24] S. Setyoningsih, "E Learning: Pembelajaran Interaktif Berbasis Teknologi Informasi," *Elementary*, vol. 3, no. 1, pp. 39–58, 2015.

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