Formation of Teaching Innovation Production Cycle Model based on the Practice of Innovative Teachers of Islamic Education

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Abstract
Many models have been built on productive innovation measures. However, each model has certain advantages and disadvantages. In the field of education, Jannsen's productive innovation measures are widely accepted. Therefore, the Jannsen productive innovation measure is used as the framework of the study. This study was conducted to explore the steps taken by innovative Islamic Education teachers in Malaysia when producing teaching innovations. The study was conducted qualitatively. Eight study participants were selected based on purposive sampling techniques. The search for study participants was made using the snowball method. Data were collected using interviews and document analysis. Interviews were conducted in a semi-structured approach. The findings of the study form nine main themes, namely; 1) identify problems, 2) identify student interests, 3) identify teacher tendencies, 4) collaborate, 5) develop innovations, 6) test effectiveness, 7) get suggestions for improvement, 8) spread the word, and 9) get feedback. These findings form the Model of Teaching Innovation Production Rotation.
Keywords: Teaching Innovation, Productive Innovation Measures, Innovative Teacher of Islamic Education, Teaching Innovation Production Cycle Model.

Introduction
Many educators find it is difficult to produce innovation (Hashim et al., 2019). This issue arises because they do not have sufficient knowledge and skills (Jima'ain et al., 2020; Ahmad & Tamuri, 2010; Abdullah et al., 2020). Therefore, there has been many discussions among academics about methods of producing innovation as a guidance for educators to produce innovation. However, there are many steps suggested by scholars and companies in the industry (Lednor, 2019). Each step provides a different focus. Kim (2017) focuses on the thought process to produce innovation, then proposes the ION Model, which is a combination of thinking in the box (inbox) and thinking outside the box (outbox) to produce new box thinking (new box). Janssen (2003) proposed three steps for the production of innovation, namely; 1) generate ideas, 2) realize ideas, and 3) promote ideas. Lednor (2019), on the other hand, suggested three steps to produce innovation, namely; 1) generate ideas, 2)

demonstrate concepts, and 3) invest to benefit from them. The difference of steps proposed by Janssen (2003) and Lednor (2019) is the third step of Lednor's (2019) which focuses on the concept of profit investment in a business, while steps by Janssen (2003) stopped on the success of innovation.

Additionally, Sola et al (2017) proposed five steps of innovation generation, namely; 1) generate ideas, 2) develop concepts, 3) evaluate and select concepts, 4) develop products, and 5) use products. However, the proposal of Sola et al (2017) is similar to Janssen's (2003). This is because the second and third steps are details of the first step, which is to generate ideas. Whereas, the step of using the product lies in the hands of the consumer, and not in the hands of the innovator. Rogers (1983), suggested six steps, namely; 1) identify problems or needs, 2) study the basics and methods of application of innovation, 3) develop the innovation, 4) commercialize the innovation, 5) disseminate the innovation, and 6) the impact of the innovation. Rogers (1983) also gives detailed steps in the phase of identifying problems or needs before producing an innovation, then formed the Innovation Decision Process Model which contains five steps, namely; 1) knowledge, 2) persuasion, 3) decision, 4) implementation, and 5) validation. Rogers's (1983) proposal is in line with the concept of innovation diffusion that he introduced. The concept of innovation diffusion emphasizes the dissemination of innovation and explains the lifespan of an innovation, which is associated with the group that is successfully influenced by the innovator to use the innovation.

Amabile (1988), on the other hand, designed two models, namely; Individual Creativity Model and Innovation Organizational Model. Both of these models are structured based on the five steps of innovation generation. Based on the Individual Creativity Model, the five steps are; 1) know the problem or task, 2) preparation, 3) generate ideas, 4) validate ideas, and 5) evaluate results. The five steps for the Innovation Organization Model are; 1) set the agenda, 2) set the stage, 3) generate ideas, 4) test and apply ideas, and 5) evaluate results. The connection between the two models is, the whole process in the Individual Creativity Model is included in the third step in the Innovation Organization Model. The difference of this model compared to other scholars' recommendations is, there are two initial steps before generating an idea. Both steps, whether in the Individual Creativity Model or the Innovation Organizational Model, are more to the determination of knowledge and the determination that an innovator should have, either as an individual or as a person performing a task in an organization.

Specifically, in the field of education, there are also several proposals of innovation production steps. Among them are steps of innovation generation by Dilobarkhon (2019), which states innovation is produced through three steps, namely; 1) generate ideas, 2) develop ideas, and 3) use the innovation. This step is almost similar to Janssen's (2003). In Rwanda, six innovation-producing steps are proposed, namely; 1) identify problems, 2) generate ideas, 3) develop practical solutions, 4) test, 5) scale-up, and 6) diffusion and adaptation (Tikly & Milligan, 2017). There is an additional sixth step, namely diffusion as suggested by Rogers (1983) and permission for the adaptation of innovations by other users. This permission is in line with the mini-c and Little-c capabilities in the 4C Creativity Model introduced by Kaufman & Beghetto (2013). Innovation in Nigeria is proposed to be produced based on five steps, namely; identify problems, 2) consider possible solutions, 3) select innovations, 4) develop and test innovations, and 5) use innovations (Chiemeka-unogu, 2018).

This proposal details the process of idea generation and combines the process of idea realization and idea promotion by Janssen (2003).

The innovation generation steps proposed by Janssen (2003) are the steps that are widely accepted and adopted in the world of education (Thurlings et al., 2015). Taking into account the views of Thurlings et al (2015), this study uses Janssen's (2003) innovation generation steps as a basic framework. However, the process of grounding the model to reality is something that needs to be explored by researchers because the steps of innovation production are not something that is linear and must take into account the process from the generation of ideas to the production and commercialization of innovative products (Tohidi & Jabbari, 2012). Therefore, the gap that this study tries to contribute is an in-depth exploration of the innovation production steps, taking into account the views of innovative Islamic Education teachers as an original innovators who produce innovations and use them for their teaching in schools.

Research Methodology
This case study was conducted qualitatively. This approach was appropriate because only teacher s who produced innovation had felt the experience of producing teaching innovation. They are grassroots innovators and are internal creators who understand the context of educational needs (Tukimin et al., 2018; Serdyukov, 2017) in Malaysia. Therefore, a total of eight study participants were selected. The selection of study participants was made using purposive sampling technique by listing four criteria of study participants (Merriam, 2009), that were; 1) teaching Islamic Education in secondary schools, 2) produce teaching innovations in the subject of Islamic Education, 3) win teaching innovation competitions at least at the state level, and 4) approachable and could collaborate. The demographic details of the study participants are as follows:

Table 1
Demographics of study participants

Study participants	Position / Grade	Highest education	The innovation produced	Awards won
Ustaz Uwais (U1)	GCPI DG52	MA	Pintar Haji (Smart Hajj), Kembara Tanah Suci (Holy Land Journey), Global Zakat Game, Cakna Solat, Eksplorasi Jom Solat (Let's Pray Exploration), The Battle of Tajweed, i5 Jawi Abqori, Jari Jawi (Jawi Finger)	• National Innovative Teacher Icon • State Innovative Teachers
Ustaz Zakkir (U2)	GCPI DG48	MA		• State Innovative Teachers • National Innovation Competition - Gold
Ustazah Huda (U3)	GCPI DG52	BA	Roda Audit Solat (Prayer Audit Wheel), Klinik Tawata, Trademark, Borang BFFT	• State Innovative Teachers • National Innovation Competition - Silver
Ustazah Aleeya (U4)	GPI DG44	BA	Hajj Pop Up Tour	• National Innovative Teacher • State Innovative Teachers • International Innovation Competition – Gold
Ustazah Ainur (U5)	GPI DG44	BA	iSolat, iSMARTBOX, Solatku Power	• International Innovation Competition – Gold
Ustaz Imdad (U6)	GCPI DG48	MA	Kit Solat Awesome, Kit MaBaSol	• State Innovative Teachers • International Innovation Competition – Gold
Ustazah Aisyah (U7)	GPI DG48	MA	Permainan Digital Kembara Haji, Waze Sirah	• State Innovative Teachers • International Innovation Competition – Gold
Ustazah Arisya (U8)	GPI DG44	BA	Dam Haji LRT	• State Innovative Teachers

- Best District Islamic Education Teacher

Researchers tried to use the network sampling that was, by asking the unit that managed Islamic Education teachers at the state and national levels, as well as the unit that managed MOE's innovation competitions and the unit that managed SPLKPM data, but they could not supply any data on the innovative teachers. This situation caused the researcher to use the snowball technique to get eight study participants. The snowball technique was ideally used when researchers were trying to track study participants who could be likened to a hidden population (Noy, 2008). The snowball technique was acceptable if operated according to the purpose (Yin, 2011), that was, subjected to the pre-established criteria (Merriam, 2009). Researchers began contacting three original study participants from three different states. Relationships with the three original study participants had been established for a long time. It was named by Noy (2008) as a power relation. Of the three original study participants, the stemmata were constructed as follows:

Figure 1
Stemmata of study participants
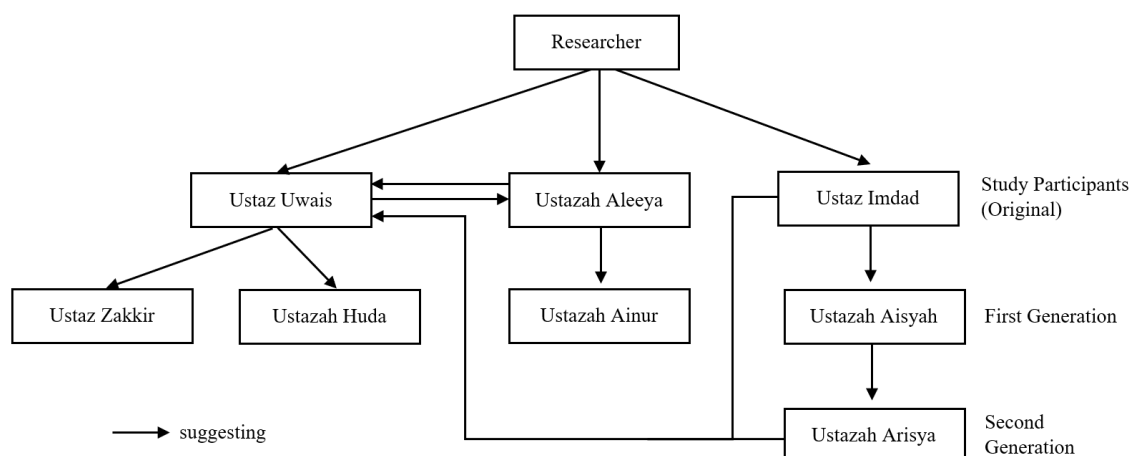
Data were collected from the interviews (TB) and document analysis (AD). The interview protocol was reviewed by three experts, namely; 1) experts in qualitative research in Islamic education, 2) experts in innovation in Islamic Education, and 3) innovative teachers of Islamic Education. They agreed that the protocol could be used in the interviews and was believed to be able to answer research questions. Interviews were conducted using a semi-structured method and were conducted face-to-face. Interviews were conducted because the researchers were not be able to observe the entire process of producing innovation (Tukimin et al., 2021). Each interview session took between 45 minutes to an hour and a half. Interviews were conducted in Malay. The interview process was recorded using an audio recording application on a mobile phone. Video recordings were also made when study participants explained the innovations produced. Each recording was transcribed with the help of transcribers. The transcriptions produced by the transcribers were reviewed by the researcher, as recommended by Merriam (2009). Document analysis was done on any document related to the innovative product. Some study participants provided documents in the form of soft copy and some provided documents in the form of hard copy. Among the

documents analyzed were; innovation reports, journal articles and proceedings, bunting, posters, pamphlets, websites, social media, and related YouTube.

Data collection took 18 months, longer than other qualitative studies such as 12 months (Zhaffar et al., 2018). Data were analyzed using NVivo Plus 12. The analysis process included the process of selection, reduction, and giving meaning to the data obtained (Patton, 2002). The continuous comparison method was also applied, allowing comparisons between data sets from one study participant at different times and different locations to be performed (Bogdan & Biklen, 2003).

Findings
The findings of the study highlighted nine main themes for innovation production steps by the Innovative Islamic Education Teachers (GIPI), namely; 1) identify problems, 2) identify students' interests, 3) identify teachers' inclinations, 4) collaborate, 5) develop innovations, 6) test the effectiveness, 7) get suggestions for improvement, 8) disseminate, and 9) get feedback.

1) Identify the Problems
When study participants wanted to produce innovation, one of the first things they did was identify the problems that exist among their students. Ustazah Huda stated, "*For me if you want to be an innovative teacher, you have to always think ... Because the innovation is born when there is a problem. If you're the type of person who doesn't know how to look for problems, and you don't like to face problems, you can't be an innovative teacher*" (U3TB1). In order to identify students' problems, teachers need to think positively and not put the problem on students alone, instead be prepared to solve the problem (U3TB1). Therefore, Ustaz Uwais produced The Battle of Tajweed because of the problem of understanding, recitation, memorization, and appreciation of students when reading the Quran (U1TB2). Ustaz Imdad, on the other hand, linked the production of the MaBaSol Kit to the problem of imperfect student prayers (U6TB2). In contrast, Ustazah Aleeya produced the Pop-up Hajj Tour due to her problems as a teacher who did not understand the topic of Hajj well (U4TB1).

2) Identify Student Interests
There is also a situation when study participants produced innovations after getting to know the interests of students. For example, Ustaz Uwais produced a gamification-based innovation after seeing students played the game Monopoly (U1TB1), while Ustazah Arisya produced a singing-based innovation because there were students who were interested and skilled in *nasyid* (singing) in a class she taught (U8TB1). In contrast, Ustazah Huda produced the Prayer Audit Wheel (RAS) by using wood as the main material for innovation due to the interest of male students in carpentry (U3TB1).

3) Identify Teacher Inclination
Study participants were also found to produce innovations based on their interests and inclinations. The teachers' inclination can be seen from two angles, namely; 1) the forms of innovation, and 2) the content. In terms of the forms of innovation, study participants produced innovations in their preferred forms. For example, Ustazah Aleeya produced mind map-based innovation (U4TB1), Ustazah Ainur tends to produce game-based innovation (U5TB2), and Ustaz Uwais tends to use ICT when producing innovation (U1TB1). In terms of

content, it can be seen that Ustaz Zakkir had produced two innovations based on Jawi, namely; Jawi Abqori and Jari Jawi (U2AD1). The production of jawi innovation is given focus because of his interest and inclination towards Jawi (U2TB2).

4) Establish Collaboration

The stage of collaboration is not necessarily undergone when producing an innovation. This is because innovation can be produced individually. However, study participants acknowledged that collaboration simplifies and ease the workflow (U1TB1; U4TB1; U6TB1) from five aspects, namely; 1) ideas generation (U5TB3; U1TB2), 2) task distribution based on the expertise of group members (U1TB1), 3) existing mistake and weakness identification and actions to minimize such mistake (U1TB1), 4) getting outside help because of the ever-expanding network of contacts (U8TB2), and 5) the ability to produce more innovations in a shorter time (U1TB2).

Study participants also discussed collaborators when producing innovations. The findings of the study showed that the study participants established collaboration with three parties. First, collaboration with fellow teachers either fellow subject committee members (U1TB2), teachers of other subjects (U3TB1; U6TB2), and peers of the same option, but from different schools (U1TB1). Second, collaboration with students, especially when the students had skills that the teacher did not have (U5TB3), and no teacher was willing to collaborate on an innovation production project (U4TB1). Third, cooperation with the higher education institutions (U1TB1). However, through collaboration with HEIs, study participants acknowledged that there were issues from a copyright standpoint (U1TB1).

5) Develop the Innovation

Study participants acknowledged that the process of developing innovation needs to be done in phases to achieve the desired level of quality as well as provide a good impact to students. Recounting her experience while developing the Pop-up Hajj Tour, Ustazah Aleeya said that the original idea was only in the form of a mind map, and was modified many times to form as it can be seen today (U4TB1). Ustazah Huda shared her experience of trying cork, cardboard, and wood as the main materials of RAS and testing the durability of each material (U3TB1).

6) Test the Effectiveness

The intended effectiveness could be seen from two aspects, namely; examination marks and morals (U3TB1). In terms of exam marks, the focus was given either to specific topics or subtopics. This was because there were innovations that were produced covering a big topic such as i5 for the pillars of Islam (U1AD1) and there were innovations that were produced specifically for certain subtopics such as Cakna Solat (U1AD1), Solatku Power! (U5AD8) and MaBaSol Kit (U6AD8), which were produced specifically for prayer procedures only. For the increase in examination marks, the increase must be significant, which reached an increase of 60% (S1U1TB1). From a moral point of view, the effectiveness could be assessed when there was a behavior change based on the problem reported. For example, through the Tawata Clinic program designed by Ustazah Huda, after a year of sessions, among the impacts were; students came to classes consistently and stay away from love relationships and regard them only as friends (S3U3AD9). To ensure that there were no flaws in an innovation, tests were performed up to 50 to 60 times (U1TB1).

7) Get suggestions for Improvement

After an innovation is produced, study participants seek the views of various parties to improve or detect the shortcomings in the innovation (U1TB1). To that end, various methods were used by the study participants. For example, Ustazah Aleeya opened an exhibition in the school office and welcomed anyone to comment (U4TB1). Ustazah Ainur entered the competition to get suggestions for improvement from experts and visitors (U5TB2).

Study participants asked the views from various parties "*because we want to make sure, our material is of quality*" (S1U1TB1). First, the views of fellow teachers. For example, Ustazah Aleeya took the initiative to ask the subject committee member at the school about how to improve the folds for the Pop-up Hajj Tour. Sometimes, there was not enough time at school, Ustazah Aleeya went to the friend's house to get a better understanding of the suggestions (U4TB1). Second, asked an expert. For example, Ustazah Aleeya asked for the opinion of a paper engineer on the best paper folding technique. While expert recommendations were not necessarily followed, they do provide new ideas to improve the innovation (U4TB1). Third, ask the students. Student suggestions and comments were valuable in the eyes of the study participants because they were considered the target users of the innovation (U1TB1). In addition to the students themselves, suggestions for improvement were also taken from students of other levels. For example, Ustaz Uwais taught in secondary schools and produced innovations for secondary school students. However, suggestions were also requested from primary school students (U1TB1). Fourth, people around who were willing to give suggestions. For example, Ustaz Uwais obtained the views of his children and the cleaning workers at the school (U1TB1).

8) Disseminate

There were several methods used for widespread dissemination. First, through competitions and publications (U5TB2). When the innovation wins a particular award, it would most likely be selected for publication (U3TB1) either in a journal or proceedings. This could be seen when the Smart Hajj innovation was published in Jurnal Pendidikan (S1U1AD1), Jom Solat Exploration was published in Wacana Intelektual (S1U1AD1) and Hajj Pop-up Card Tour was published in Proceedings of International Education Research Seminar (S4U4AD10). Second, through sales. Sales could be made themselves or handed over to the company to manage. Self-sales were done with the help of sales representatives among close friends (U2TB2). However, there were also study participants such as Ustazah Ainur, who promoted 'Solatku Power!' using a virtual medium, thus successfully marketed her products across state borders (U5TB2). In addition, there were also study participants who left it to the company to sell and further expand the benefit dissemination of the innovation. This method was admittedly better than self-selling (U1TB2). However, to be widely used by the company, the innovations produced need to cover a wide range of topics to facilitate the promotion (U2TB1).

9) Get Feedback

Not all study participants went through the process of getting feedback. This was because this process was usually undergone by study participants who sell their innovative products. When an innovative product hit the market, study participants acknowledged, there would be feedback received, either positive or negative. If there was negative feedback,

study participants need to remodify the innovation so that the weakness could be overcome (U1TB1). Sometimes, the weaknesses that arise were small, such as misunderstandings of the innovation user manual (U1TB1). Issues like these arise because the innovation design process would be refined by the company. If the editor in the company did not understand how to use the innovation, this error could occur (U1TB1). Therefore, improvements needed to be made before the production of the latest release of the innovation (U1TB1).

Discussion

The theme of problem identification is indeed synonymous with the innovation generation step (Chiemeka-unogu, 2018; Redding et al., 2013; Tikly & Milligan, 2017). Meanwhile, the theme of identifying students' interests is related to the concept of pedagogical content knowledge, namely knowledge about students (Shulman, 1987) and in line with the practice of the Outstanding Islamic Education Teacher when teaching the faith (*aqeedah*) (Kassim & Tamuri, 2010) and worship ('*ibadah*) (Hussin, 2015). The theme of identifying teachers' tendencies can also be linked to the domain of self-knowledge in the concept of pedagogical content knowledge, as suggested by Nur Hanani Hussin (2015). Pedagogical Content Knowledge is indeed one of the necessary knowledge for teachers when they want to produce innovation (Thurlings et al., 2015).

The theme of establishing cooperation is also in line with the concept of *ta'awun* for goodness and piety (al-Maidah, 5: 2). The need for cooperation is emphasized by Amabile (1988), who distinguishes between creativity and innovation, then viewed that innovation can only be produced through collaboration. However, in this case, the collaboration needs to be with someone who can face both easy and difficult situations when innovating. Therefore, not all study participants had partners to collaborate with. Some of them are more comfortable producing innovation alone. This suited the character of an introverted innovator (Langgulung, 1991). However, in some cases, cooperation is still believed to be able to simplify matters when generating innovation. Therefore, among the skills that need to be present when producing innovation are social skills (Amabile, 1988).

The theme of developing innovation, testing the effectiveness of innovation, and suggestions for improvement are included in the common steps listed by scholars (Angevine et al., 2019; Chiemeka-unogu, 2018; Tikly & Milligan, 2017). The theme of dissemination is in line with the concept of diffusion of innovation introduced by Rogers (1983). In the explanation of this theme, the researcher covers the process of selling innovation by the study participants as suggested by Tohidi & Jabbari (2012). In addition, the researcher also added the ninth theme, which is to get feedback from customers on the advantages and disadvantages of an innovative product to make improvements to the existing products. The addition of this theme is in line with the concept of living innovation, that is, customers are considered co-creators, who provide the best feedback because they are users of the innovation and know about the pros and cons of a product in reality (Mathe, 2016). In this study context, customers refer to teachers who purchase teaching innovations produced by innovative teachers and students to those teachers or parents who purchase such innovations for the use of their children.

Conclusion

Nine themes are formed on the steps of innovation production by innovative Islamic education teachers, namely; 1) identify problems, 2) identify students' interests, 3) identify teachers' inclinations, 4) collaborate, 5) develop innovations, 6) test the effectiveness, 7) get suggestions for improvement, 8) disseminate, and 9) get feedback. Themes 1, 2, 3, 4, and 9 were not undergone by all study participants. For example, for themes one until three, there are study participants who only go through one or two steps, and there are study participants who go through all three steps. The same goes for theme four, which is to collaborate. Some innovations are produced on their own without anyone's help. Meanwhile, theme nine was only gone through by the study participants who sold their innovative products. Not all study participants sold their innovative products. The spread of innovative ideas only stopped at competitions and publications.

Based on the framework of three innovation generation processes by Janssen (2003), therefore, themes one to three are placed in the idea generation phase. While themes four to seven are included under the idea realization phase. Themes eight and nine are included in the idea promotion phase. This situation forms the Teaching Innovation Production Cycle Model by GIPI. In short, this model can be understood through the Figure 2:

Figure 2
Teaching Innovation Production Cycle Model
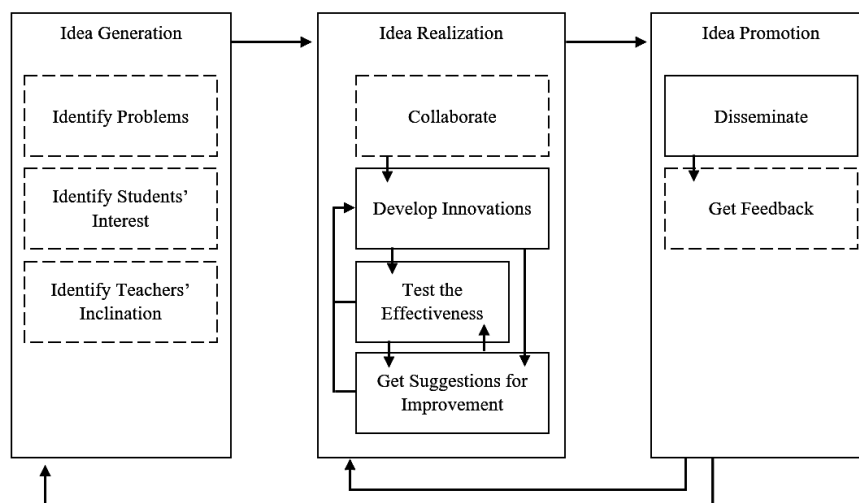
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