Clinical Simulation in Nursing (2025) 102, 101723

Clinical Simulation in Nursing

www.elsevier.com/locate/ecsn

Current state of simulation in advanced practice nursing programs: A survey in French-speaking countries

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KEYWORDS
Advance practice nurse;
Curriculum;
Education;
Faculty development;
Simulation

Abstract

Background: In the French-speaking world, the role of advanced practice nurse (APN) has been evolving, with the establishment of numerous training programs. Simulation-based education plays a key role in APN training, yet no survey has assessed the specifics of its current use. This study aims to investigate the current state of simulation use in APN education in three French-speaking countries and compare these results with North American standards.

Methods: A descriptive survey was conducted, using a 32-item questionnaire, across APN programs in three French-speaking countries: Belgium, France and Canada. The survey covered general information, use of simulation, factors influencing simulation use and evaluation of simulation programs. The survey was distributed to APN training institutions via email.

Results: Responses were collected from 36 APN training centers across the three different French-speaking countries, with 93% of programs found to be incorporating simulation. Barriers included financial constraints and staffing shortages. Similarities and differences between French-speaking countries and North America were outlined.

Conclusions: This study highlights the integration of simulation in APN programs across three French-speaking countries, despite challenges such as limited resources. Telesimulation and interdisciplinarity simulation offer potential for future research. Comparisons with U.S. programs reveal similarities, indicating a global need to improve training for APN.

Cite this article:
Chevalier, S., Paquay, M., Ghuysen, A. & Stipulante, S. (2025, Month). Current state of simulation in advanced practice nursing programs: A survey in French-speaking countries. *Clinical Simulation in Nursing*, 102, 101723. https://doi.org/10.1016/j.ecns.2025.101723.

Introduction

As stated by the International Secretariat of French-Speaking Nurses (SIDIIEF), advanced practice nurses

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https://doi.org/10.1016/j.ecns.2025.101723

(APNs) focus on people, families and communities, using scientific evidence, advanced knowledge and clinical judgment from postgraduate training. APNs aim to enhance care quality and safety through leadership, collaboration, research and ethical reflection, with recognition varying by country (SIDIIEF, 2018). The role and practices of APNs may vary considerably by country (De Raeve et al., 2024). In the three French-speaking countries in focus for this study, APN practices are well established (SIDIIEF, 2018) with clear legislative frameworks and specific training programs. In France, there is a state diploma in advanced practice nursing, while Canada has a diploma in advanced nursing practice (Colson et al., 2021). In Belgium, a legal framework recognizing the role of APN will soon be in application in 2025. There, the Master of Nursing Sciences prepares nurses for APN roles in collaboration with nursing schools and universities. In Switzerland, discussions on this point have been underway.

Despite discrepancies, the SIDIIEF has agreed on a shared conceptual model to define this role. The Hamric model (SIDIIEF, 2018) describes three essential criteria for APNs: graduate education, certification, and practice focused on patients and families (Hamric et al., 2009). Education is therefore key (De Raeve et al., 2024) and must be carefully considered to ensure that future APN are optimally trained. However, such training is relatively new in certain French-speaking regions, where institutions have had to create different educational pathways, possibly using simulation-based training. Indeed, simulation-based training has been increasingly used in educational courses for healthcare professionals (El Hussein & Favell, 2022). However, the current use of simulation in APN programs remains unclear (El Hussein & Favell, 2022) with poor standardization between existing APN programs. Current use of simulation in North America was recently examined, to identify the perceived barriers and the educational resources needed to achieve simulation training programs of quality simulation of quality (Nye et al., 2019). The innovative study revealed that simulation has been integrated into most APN training programs in North America (Nye et al., 2019). Moreover, the development and implementation of APN simulations is guided by the standards set by the International Nursing Association for Clinical Simulation and Learning (INACSL) (Nye et al., 2019).

Such a survey has not yet been conducted in French-speaking countries. The data collected from such studies would allow institutions and trainers to better design their simulation programs. In addition, such information could help institutions where APN simulation training is being developed by providing standards for use in future courses. In this context, we aimed to investigate the current use of simulation in APN training in French-speaking countries. Our secondary objective was to compare data obtained in the French-speaking countries with the previous North American study.

Theoretical framework

The nursing education system in the three French-speaking countries specified varies by region, but generally follows a structured pathway that includes both theoretical instruction and clinical training. Admission requirements for nursing education in these French-speaking countries have typically focused on completion of secondary education. In France and Belgium, nursing education is provided through dedicated nursing schools, leading to a bachelor's degree in nursing (usually over three or four years). In Canada (Québec), the pathway consists of a Bachelor of Science in Nursing delivered by a university faculty of nursing. Some countries, such as Belgium, offer additional training courses in specific areas (pediatrics, emergencies, etc.). After this program of nursing, there are two-year Master of Nursing Sciences degrees or advanced nursing practice programs at university.

In accordance with the North American study by Nye et al., 2019, Kolb's Experiential Learning Theory (Kolb, 2015; Kolb & Kolb, 2005; Kolb, 2014; Poore et al., 2014) was applied as the theoretical framework for this study. This framework highlights learning as a transformational process, explaining how individuals acquire knowledge through experience. The model is depicted as a cyclical process with four stages: active experimentation, concrete experience, reflective observation and abstract conceptualization. This framework underpins simulation as a bridge between theory and practice, enabling students to develop into safe, vigilant and reflective practitioners committed to excellence in patient care and the mastery of essential competencies (Daley & Campbell, 2018). Simulation training is considered an effective pedagogical method for developing a variety of skills, including professional, psychometric, cognitive and affective abilities (Lavoie et al., 2018). The key advantage of simulation lies in its ability to deliver a standardized and consistent learning experience through carefully planned and well-executed scenarios, which surpasses the unpredictability of the clinical environment (Kolb, 2015). From that perspective, simulation programs should be carefully designed and implemented, with particular attention to evidence-based guidelines, to ensure that learners are provided with essential learning opportunities during their education (Nye et al., 2019).

Methods

Research design

A descriptive study was conducted to address two main research questions:

1) What is the current state of simulation in APN programs in French-speaking countries?

2) What are the similarities and differences between simulation programs forming part of APN education in French-speaking and English-speaking North America?

Additionally, a series of research subquestions were formulated:

- What are the themes and modalities most frequently used in APN programs in the specified French-speaking countries?
- What are the perceived facilitators and barriers to using simulation in these APN programs?
- How willing are teachers regarding simulation in APN programs?

We did not formulate specific hypotheses, as the aim was to adopt an exploratory approach.

Population

The study population comprised educators who deliver practical training, including professional integration activities, simulations and internships, which are incorporated into APN or nursing science programs in French-speaking countries. Depending on the country, these two types of programs are designed to train APN (e.g. APN programs in France and Master of Nursing Sciences in Belgium). We identified a total of 40 institutions offering such educational programs across four different countries (Canada, France, Switzerland and Belgium). The institutions were identified through established databases, including those maintained by professional associations, as well as via the websites of online training providers. All identified institutions were subsequently contacted and invited to participate in the study.

Assessment instruments

Instruments

A questionnaire was developed to investigate current simulation use in APN programs in the identified French-speaking countries. Two of the team of researchers (SS and SC) developed the questionnaire, which consisted of 32 questions in total. The survey required approximately 15-20 minutes to complete and included both open- and closed-ended questions. The questionnaire was organized into four sections: general information (11 questions), use of simulation in training (16 questions), factors that support and hinder the use of simulation in training (two questions) and evaluation of the simulation program (three questions).

Validation of instruments

The questionnaire was validated using the Delphi methodology (Blieck et al., 2019). To undertake the validation, simulation experts and nursing training teachers from French-speaking Belgium were selected based on convenience. The experts were contacted via email to confirm their willingness to participate in the validation process. The initial round involved 10 experts, while the final round comprised six participants. Four experts who participated in the first round did not respond to the second round.

The experts rated each question's relevance on a Likert scale from one (not relevant) to four (very relevant), and were asked to provide justification for scores below three. Questions were considered validated if they obtained a median score greater than three and an interquartile range lower than one across all the scores provided by the experts in the round. For final validation, the stability of the experts' responses was measured between two rounds using the Wilcoxon rank-sum test. Questions that did not meet the validation criteria were revised by the researchers for the next round based on experts' comments. A third round of validation of the questionnaire followed the Delphi process. It was subsequently digitized using DragSurvey® and tested in a pilot study involving researchers and colleagues, which resulted in minor revisions.

Data collection

The survey was distributed via email to all previously identified institutions, either to the deans or to the relevant professors. If these contact email addresses were unavailable, the email was forwarded to the secretariats or pedagogical coordinators, who then relayed it to the relevant teachers at their institution. The survey remained open for a period of two months, from August to October 2022. During this time, the researchers sent two reminder emails. The researcher's email address was provided to address any questions regarding the study.

Data analysis

The DragSurvey® software was used for survey deployment and data collection. After the data collection stage was completed, the software compiled all responses by question. For closed-ended questions, the software calculated the total percentage of respondents for each response option. For open-ended questions, all responses were transcribed verbatim. The data were then exported to Excel files, where they were organized and sorted to create a comprehensive database. The researchers coded and referenced the responses to closed-ended questions in a codebook. Analysis was conducted on the responses to open-ended questions, with each response linked to a verbatim report. The results of the study were structured into four parts: socio-demographic data, the current state of simulation in the French-speaking countries, facilitators and barriers, and the willingness of teachers to participate in simulation programs.

Ethical considerations

This study was approved by the ethical committee of Liege University Hospital of Liège (reference number: 2022/14). All participants provided their informed consent to participate in the study by selecting a checkbox prior to beginning the questionnaire: "I give my consent for my data to be used anonymously in this study and I agree to participate freely in this study''. In addition, the questionnaire responses were anonymized.

Results

Socio-demographic data and general information

Among the 40 French-speaking institutions contacted, 36 participants responded, eight of whom (22%) did not complete the entire questionnaire.

Table 1 provides socio-demographic data and general information about the study population and programs.

Current state in the French-speaking countries: what is the current state of simulation in APN programs in the specified French-speaking countries?

Themes, skills and modalities in APN programs in the French-speaking countries

Most respondents incorporated simulation into their programs (n = 28; 93%). Only two did not, but they expressed interest in future integration. The respondents identified three main areas of interest: clinical situations connected to practice (n = 10), development of professional identity (n = 8) and learning or enhancing skills (n = 8).

Simulation was included in most professional integration activities (n = 19) and clinical courses (n = 19), and was primarily used for formative evaluation (n = 15). Eight respondents employed a mixed-assessment approach, combining certifying and formative elements. The number of simulation hours varied widely across institutions. Responses ranged from specific hours to time percentages, with most indicating 10-20 hours per year (n = 6).

Regarding the number of instructors and participants, the majority of simulations involved two instructors (n = 22). Group sizes were typically 10-15 (n = 16) or 6-10 students (n = 8).

Table 2 describes the modality of simulation, themes and type of skills developed in the simulation programs at the institutions.

Most respondents (n = 20) indicated using guidelines to design simulation scenarios and debriefings, drawing from sources such as the High Authority of Health (n = 5), expert best practices (n = 5), INACSL standards (n = 3), the PEARLS method (n = 2) and evidence-based nursing reference books (n = 2).

Fewer than half of respondents (n = 12) said they use tools to assess the quality of simulations and instructors. They reported using internal evaluation systems (n = 5), simulation coaches or co-debriefing (n = 3), student satisfaction questionnaires (n = 3) and the debriefing assessment for simulation in healthcare (DASH tool) (n = 2).

Facilitators and barriers to the use of simulation in APN programs

Respondents identified key facilitators and barriers to using simulation in APN programs, with an option to suggest others alongside those suggested. The top facilitators were available facilities and equipment (n = 23), trained staff (n = 22), curriculum integration (n = 17), and allocated teacher workload (n = 13). The main barriers included excessive teacher workload (n = 18), insufficient funding (n = 16), lack of staff (n = 14) and limited facilities (n = 14).

Willingness of teachers to use simulation programs in APN courses

Respondents largely felt that simulation hours in APN training were insufficient (n = 21) or just adequate (n = 7); none considered the hours excessive. Many advocated for additional hours to address the broad clinical scope of APN programs but acknowledged challenges such as limited time, resources and infrastructure.

Regarding group size, most preferred 10-15 students (n = 11) or 6-10 students (n = 10) for simulation training. When asked about harmonizing simulation programs for APN training nationally, the majority supported the idea (n = 19), while others opposed it (n = 8). Key justifications included facilitating shared themes, scenarios or tools (n = 6); developing joint programs with common objectives (n = 5); adapting practices to institutional resources (n = 5); and preserving training specificity across institutions and specializations (n = 4).

Comparison with North America: What are the similarities and differences between simulation programs forming part of APN education in French-speaking and English-speaking North America?

In 2018, Nye et al. conducted a descriptive survey to examine the current state of simulation in APN programs in North America, focusing specifically on the English-speaking region of Canada and the United States. This section compares the results obtained in our study for the current state of simulation use in APN training in the French-speaking region of Canada with those from the English-speaking regions of North America (Nye et al., 2019), as well as with the guidelines from the American Association of Colleges of Nursing (Dugan et al., 2023). Table 3 outlines the similarities and differences between these two current states.

Table 1 – Socio-Demographic Data and General Information.

Variables	Conditions	Number n (Percentage, %)
Country	Belgium	4 (11)
	France	22 (63)
	Canada	9 (26)
Institution of respondents	Nurse school (type bachelor's degree)	3 (9)
	University (type master's degree)	32 (91)
	Center of simulation	2 (6)
	Other	3 (9)
Level of training of respondents	Nurse school level (bachelor's degree)	1 (3)
	University level (master's degree)	23 (66)
	Doctoral level	7 (20)
	Postdoctoral level	4 (11)
Teaching experience	0-5 years	7 (21)
	5-10 years	6 (18)
	More than 10 years	20 (61)
Simulation experience	0-5 years	13 (41)
	5-10 years	11 (34)
	More than 10 years	8 (25)
Part time in simulation	0%	12 (39)
	25%	6 (19)
	50%	3 (10)
	75%	2 (6)
	100%	0 (0)
	Other (variable part time)	8 (26)
Simulation training	Yes	21 (66)
	No	11 (34)
Type of simulation training	Self-learning	11 (55)
	Mentored learning with trained teachers	16 (80)
	Simulation training in your institution	11 (55)
	Simulation training out your institution	10 (50)
	Online training	5 (25)
	Simulation conference	9 (45)
	Simulation certificate	3 (15)
	Other	1 (5)
Principal work	Clinic	8 (26)
	Teaching	25 (81)
	Research	8 (26)
	Management	8 (26)
	Team leader (care or teaching)	9 (29)
	Other	2 (6)
Type(s) of training organized in your institution	Master's in nursing sciences	11 (37)
	State diploma in advanced practice nursing	15 (50)
	Master's degree in nursing	8 (27)
	Complementary diploma in advanced nursing practice	5 (16)
	Other	2 (6)
Number of students in training (per years)	0-25	13 (43)
	26-50	11 (37)
	51-100	6 (20)
	More than 100	0 (0)

Table 2 – Thematic, Skills, and Modalities in Simulation Programs.

Variables	Conditions	Number n (Percentage, %)
Simulation themes	Nursing consultation	26 (93)
	Clinical assessment	24 (86)
	Therapeutic patient education	16 (57)
	Crisis resource management	8 (29)
	Interdisciplinary	18 (64)
	Other	3 (11)
Type of skills developed	Technical skills	1 (4)
	Nontechnical skills	5 (18)
	Technical and nontechnical skills	22 (78)
	Clinical judgment	21 (75)
Modalities	Standardized patients	23 (82)
	Role plays	24 (86)
	Computer	2 (7)
	Procedural material	8 (28)
	Low-fidelity mannequins	12 (43)
	Medium to high fidelity mannequins	12 (43)
	Virtual reality/Augmented reality	3 (11)

Table 3 – Comparison Between Simulation Programs in the French-Speaking and English-Speaking in North America Countries.

	French-Speaking Countries	North America Countries
=	High rate of simulation (more than 90%) Positive perception of simulation Majority of formative evaluation Most modality of simulation: standardized patients and role-plays Main barrier to the use of simulation	
		French-speaking countries	North America countries
≠	Integration of simulation	Implemented across various courses, including clinical and professional integration activities.	Encouraged to be integrated throughout the curriculum to enhance clinical learning experiences
	Purpose of simulation	Primarily used for formative evaluation with limited use in summative assessments.	Supports both formative and summative evaluations to assess competencies and clinical judgment.
	Hours of simulation	10-20 hours per year	1-20 hours for the entire program
	Use of guidelines	Limited adherence to standardized guidelines for simulation practices.	Emphasizes the use of evidence-based guidelines and best practices in simulation design and implementation.
	Willingness of teachers	Harmonise training pathways and more simulation hours	Training of simulation instructors and replacement of some clinical hours with simulation

Discussion

The aim of this study was to examine the current use of simulation in APN programs within French-speaking countries and to compare with the previous results of a similar study focused on North America. The findings indicate that most institutions (93%) incorporate simulation into their APN programs, primarily targeting clinical practice, professional identity and skills development. These activities are typically conducted in

groups of 6-15 students, with an average duration of 10-20 hours.

Key facilitators of incorporating simulation training in APN programs include facilities, trained staff and curriculum integration, while the identified barriers are workload, funding and resource limitations. Teachers stated that they find simulation hours insufficient and support national harmonization for shared tools and objectives, though some prefer institutional specificity.

Current state in the French-speaking countries

We found that most of the French-speaking programs examined included simulation courses. Simulation is widely used in the majority of APN programs internationally (Campbell et al., 2021) but additional evidence is required to accurately understand the true value of such an approach. According to a recent scoping review, the impact of simulation-based learning on the acquisition of APN skills, such as clinical reasoning and consultation, should still be investigated in the context of comparison with traditional teaching methods (El Hussein & Favell, 2022). In addition, robust international studies are needed to assess the long-term impact of simulation on developing APN skills and demonstrate the real clinical value of simulation-based training.

In this current study, most respondents said they conducted simulation courses with two instructors and 10-15 participants, with the majority of programs dedicating 10-20 hours per year to simulation training. The literature does not provide clear guidelines regarding the optimal number of simulation-based training participants, instructors or hours for APN programs. According to the INACSL, the number of participants should be tailored to the scenarios and their educational objectives (Sittner et al., 2015). This number typically ranges from four to six participants per scenario (INACSL, 2016), with consideration also given to the role of observers during the simulation (O'Regan et al., 2016). Inclusion of observers during APN simulations is an interesting option for increasing the number of participants and limiting the physical and temporal constraints linked to simulation training. Concerning the number of hours, balance should be found between the educational benefits for future APN and the financial constraints of institutions. More studies are needed to determine the cost-effectiveness of simulation training and its impact compared to clinical internships. These findings would provide an opportunity to evaluate the optimal role of simulation in APN programs, considering both its pedagogical effectiveness and the available resources to ensure the most effective and appropriate implementation of simulation.

In our study, the main simulation themes explored were in line with the international role of APN (SIDIIEF, 2018). When developing simulation programs, themes should be in line with the skills profile. Additionally, simulation methods must be consistent with teaching objectives (Sittner et al., 2015). For example, it has been shown that use of a high-fidelity simulator does not lead to better learning for advanced life support training than a low-fidelity simulator (Massoth et al., 2019). Additionally, the use of high-fidelity simulation involves significant cost, which may hinder the implementation of simulation in institutions. Conversely, the use of standardized patients and role playing is less expensive and particularly relevant for developing skills in consultation, communication and education.

Facilitators and barriers

Alongside support for simulation on the part of teachers, the implementation of simulation in APN programs requires strategic and technological backing (Nye et al., 2019). The most common obstacles identified appear to be international and inherent in the development of simulation itself (Campbell et al., 2021; Elendu et al., 2024; Hosny et al., 2017; Nye et al., 2019). Many educators stated they perceive this lack of support as an external barrier impacting their ability to provide quality simulation (Campbell et al., 2021). To overcome such challenges, advanced technologies such as artificial intelligence and enhanced virtual reality applications hold promise for improving the effectiveness and accessibility of simulation training in the future (Elendu et al., 2024). One possible solution to address this lack of resources could be telesimulation, which is a teaching method using videoconferencing and computer simulations to teach, train and assess students who are not physically present at the school (McCoy et al., 2017). This method was indeed implemented during the COVID-19 pandemic and effectiveness with teaching students in this manner was demonstrated (Diaz & Walsh, 2021; Garrison et al., 2023; Yasser et al., 2023).

In addition to technological solutions, integrating shared learning paths (Chevalier et al., 2025) and interprofessional simulations (Freeman et al., 2024) could be beneficial. Many medical skills, such as suturing, overlap with APN competencies, yet these procedural simulations are currently delivered separately for physicians and APNs. Developing a unified simulation programme for both groups could enhance mutual understanding and foster collaboration during training (Saragih et al., 2024), while simultaneously addressing barriers to simulation implementation by optimizing material and human resources.

Willingness of teachers concerning simulation programs

Despite the identified barriers, the dedication of APN educators to simulation sustains their motivation and resilience (Campbell et al., 2021). This commitment plays a key role in enhancing the quality of simulation-based

teaching (Baayd et al., 2023). Respondents in the current study expressed a strong desire for more simulation hours across programs, though this may reflect a pro-simulation bias, as those already supportive of simulation might have been more likely to participate. While simulation holds great appeal, its use should be thoughtfully balanced against costs and educational outcomes. Engaging educators and leaders outside the field of simulation in this discussion could provide valuable perspectives.

The second priority identified was the desire to develop joint programs or initiatives based on shared objectives. Furthermore, respondents highlighted the importance of tailoring practices to each institution's unique context and preserving the specificity of training for various specializations. Creating a shared competency framework and unified educational objectives could be a valuable first step toward harmonizing simulation programs. To support these efforts, the Simulation Guidelines and Best Practices for Nurse Practitioner Programs (Campbell et al., 2021; Lioce et al., 2020) and evidence-based guidelines from the International Nursing Association of Clinical Simulation and Learning (Hallmark et al., 2021) offer practical recommendations and standards for program development.

Comparison between French-speaking regions and North American data

Differences in APN training between North America and the French-speaking countries in focus for this study can be largely attributed to North America's longer history with these programs. This longer history has allowed for the development of diverse simulation programs and evaluation methods, unlike in the French-speaking countries, where most programs are still in their early stages. Additionally, legislative and healthcare contexts vary significantly between the regions, influencing both APN curricula and practitioner competencies. In North America, summative evaluation is widely used due to established legislative frameworks requiring standardized skill validation. Simulation hours often replace internship hours because of limited placement opportunities, necessitating rigorous evaluation to ensure clinical competency. Despite these contextual differences, simulation is a shared component of APN education worldwide and faces similar implementation challenges. International collaboration and research could help standardize simulation programs, address barriers and assess the cost-effectiveness of these training methods.

Limitations

This study had some limitations and biases. The data could not be generalized to all APN training programs due to the complex distribution of respondents across different institutions, and some institutions may not have been represented among the respondents. Additionally, the data pertained to a specific period in 2022 and may not have fully reflected the current practices. Further research is needed to update and expand upon the findings, which will be conducted by the current group through qualitative interviews.

Another potential limitation was pro-simulation bias, where respondents who favor simulation may have been more likely to complete the questionnaire, possibly excluding nonsimulation users. Additionally, the experts who validated the questionnaire using the Delphi method were all from Belgium, which may have resulted in a lack of understanding of terminology among participants from other countries. Involving international French-speaking experts would have provided a broader perspective.

Conclusion

This study provides an overview of simulation in APN programs in three French-speaking countries, where most respondents integrate simulation-based training into their curricula and recognize its benefits. However, challenges such as a lack of financial, human or material support persist. Teachers are willing to harmonize training programs, guided by the recommendations of national working groups. Strengthening simulation instructor training within APN programs could further improve education quality. A comparison with a U.S. study revealed similarities between French- and English-speaking education systems despite differing contexts. Advanced practice has rapidly been developing in the French-speaking countries, necessitating reflection on the development and quality of training programs. Telesimulation presents a promising avenue for future research.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

None.

CRediT authorship contribution statement

Sabrina Chevalier: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Méryl Paquay:** Writing – review & editing, Validation, Supervision. **Alexandre Ghuysen:** Writing – review & editing, Validation, Supervision, Methodology, Data curation, Conceptualization. **Samuel Stipulante:** Writing – review & editing, Validation, Supervision, Methodology, Data curation, Conceptualization.

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