


BMJ Open Effects of a blended multimedia teaching approach on self-efficacy and skills in over-the-counter medication counselling versus a lecture-based approach: protocol for a prospective cohort study of undergraduate students from a pharmacy school in Taiwan

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ABSTRACT

Introduction Addressing communication skills in pharmacy curricula is one of the effective tactics to equip future pharmacists with better skillsets for medication counselling. To achieve this, blended teaching of PowerPoint slides and videos holds great potential for undergraduate pharmacy education majors by integrating multimedia and performance feedback into instruction. This study will develop a blended teaching programme featuring didactic lectures with video-based materials to improve students' self-efficacy and skills in medication counselling.

Methods and analysis This study applies critical principles and effects outlined in multimedia learning by Richard Mayer *et al* to develop teaching materials and perform skill evaluation for two undergraduate cohorts (class of 2025 and 2026) enrolled in Introduction to Community Pharmacy separately in 2022 and 2023. Students will receive different teaching approaches to medication counselling. In the control cohort (ie, class of 2025), students will receive a 4-week PowerPoint slides-based instruction in communication skills. We will develop six videos illustrating common scenarios of over-the-counter (OTC) medication counselling in community pharmacies. In the intervention cohort (ie, class of 2026), students will receive a 3-week PowerPoint slides-based instruction and a week-long video-based instruction in communication skills. A pre-and-post survey will be administered to evaluate students' self-efficacy in OTC counselling. In addition, each student will be evaluated through one-on-one role-playing with standardised patients in the final to demonstrate their skills in OTC counselling. A structured checklist will be used to assess students' counselling skills. T-tests will be applied to examine differences in self-efficacy of OTC counselling. Multivariate regression analyses will determine which teaching approach better facilitates the development of self-efficacy and performance in OTC counselling.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This two-cohort comparative study will evaluate the impacts of a blended multimedia teaching approach of PowerPoint slides and videos on students' self-efficacy and communication skills in over-the-counter (OTC) medication counselling, compared with a conventional lecture-based approach.
- ⇒ Six scenario-based videos will be developed to demonstrate practice scenarios to improve pharmacy students' self-efficacy and skills with respect to OTC counselling.
- ⇒ The use of a self-report survey and a structured checklist will assess students' competency in OTC counselling from the perspectives of students and instructors.
- ⇒ The study will be carried out in a single pharmacy school that may limit the generalisability of the findings.

Ethics and dissemination The Research Ethics Committee of the National Taiwan University Hospital approved this study. The findings will be shared with pharmacy educators and contribute to existing instructional methods to facilitate the competence of pharmacy students in OTC counselling.

INTRODUCTION

Communication is considered a core competency for pharmacists.¹ Pharmacists who are able to effectively provide medication consultations ensure medication safety of the public and improve their health.^{2,3} WHO emphasises that pharmacists play a critical role in the dissemination of medication information in community healthcare. For example, pharmacists can offer consultations

for over-the-counter (OTC) medications, promote vaccination services and assist individuals in smoking cessation.^{4 5} However, not every pharmacist can effectively apply professional communication skills in the practice of patient care,⁶ making it vital to equip students with effective communication skills at the professional development stage.⁷ Whereas the existing literature has revealed that well-designed curriculum and training can effectively improve communication skills,^{8–10} there is a void of standardised instructional methods or standards for teaching communication skills in pharmacy education to ensure high instructional quality and accountability.^{11–13} Studies have shown that diversified instructional methods, such as using role demonstration, multimedia learning and experiential learning, in addition to conventional in-class lectures,¹⁴ can facilitate proactive learning and foster communication skills, eventually improving transfer (ie, applying learnt knowledge and skills to solve real-life problems).^{10 13} That is, cultivating communication skills requires an integration of multiple instructional strategies, rich learning materials and opportunities of hands-on practice.²

Limited and outdated teaching resources and materials are the most commonly cited obstacles to cultivating communication skills.¹ Instructors report that tight time frame, budget, space, and staffing restrict the scope of communication skills instruction and its effectiveness.¹⁵ Students report that some teaching content deviates from real-world practice, indicating that in-class and simulated cases seem contrived and unnatural.¹⁶ Furthermore, the lack of iterative practice and real-time feedback, as well as overloaded instructional content, decrease students' motivation, self-efficacy and ability to fully grasp the essence of communication.² Therefore, quality learning materials that maximise understanding the best practice of medication consultation, practice-based training model, standardised assessment and timely feedback for students should be prioritised from the phase of curriculum development, instruction, to evaluation.¹⁷

A promising yet underused instructional approach is blended multimedia learning that taps into principles of multimedia learning stemming from voluminous empirical research of cognitive psychology and practice-based training. This approach further integrates the instructional and learning materials into face-to-face lectures,¹⁸ followed by in-class case studies and hands-on practice. Communication skills training is a dynamic interaction in which multiple context-dependent components are at play.¹⁹ Regarded as one of the effective methods for teaching communication skills, studies involving undergraduate students have revealed that integrating lecture with multimedia materials allows students to learn and apply professional skills, since students use dual cognitive channels simultaneously (ie, visual (images) and auditory (language) information).²⁰

However, most pharmacy courses are taught in a traditional format: lectures coupled with text-rich PowerPoint slides, even in hands-on skill courses (eg, communication).

The problem of unilateral, lecture-based instruction without multimedia materials (eg, animation, audio or videos) or hands-on practice (eg, role-playing) is that students may have a difficult time processing procedural knowledge.²¹ The lack of frequent learner-instructor interactions leaves students with little real-time feedback to improve their behaviours immediately. For example, students may be unable to reify abstract communication concepts into real-world medication consultation practice.²²

Fortunately, blended multimedia teaching has gained attention in pharmacy courses focusing on medication consultation services. For example, interactive online teaching activities have been applied to train students to offer consultations for smoking cessation.²³ Videos of actual cases have been used to teach students to conduct medication consultations for topical agents.²⁴ Noetel *et al* discovered that substituting video teaching for traditional teaching methods (eg, lectures) only slightly improved learning effectiveness; however, when used in conjunction with traditional teaching methods, video teaching significantly improved learning outcomes.²⁰ Visual symbols effectively render abstract concepts more concrete, which enables learners to retain the material more easily and helps familiarise learners of insufficient background knowledge with key information. In contrast, auditory symbols work better for learners with sufficient background knowledge by expanding their understanding of subject materials.²⁵ The multimedia learning theory in cognitive psychology indicates that visual and auditory information can enhance learning performance when properly copresented.²⁶ Compared with plain text or still images, videos help students construct a more comprehensive mental model, understand abstract concepts and later demonstrate their gain following the learning session.^{20 25} Therefore, we hypothesised that using captioned videos of real-world scenarios in addition to conventional in-class lectures improves self-efficacy and skills of pharmacy students in medication consultation. Self-efficacy is one of the prominent factors that affect student performance.²⁷ Students with high levels of self-efficacy attribute their excellent performance to increased commitment to professional development, continual effort into active learning, and perseverance in healthcare practice.²⁸

In the proposed course, we attempt to develop a teaching programme using a blended multimedia learning approach to facilitate the skills and competence of medication consultation among pharmacy students. The instructional approach will contribute to curriculum development and course preparation. The student learning outcomes will be evaluated by a structured summative assessment of the use of the Symptom-Allergy-Indication-Direction-Self-care (SAIDS) medication consulting procedure.²⁹ The SAIDS approach has been implemented in community pharmacy practice and shown to help entry-level pharmacists effectively improve consumers' awareness of correct OTC use.²⁹ The SAIDS

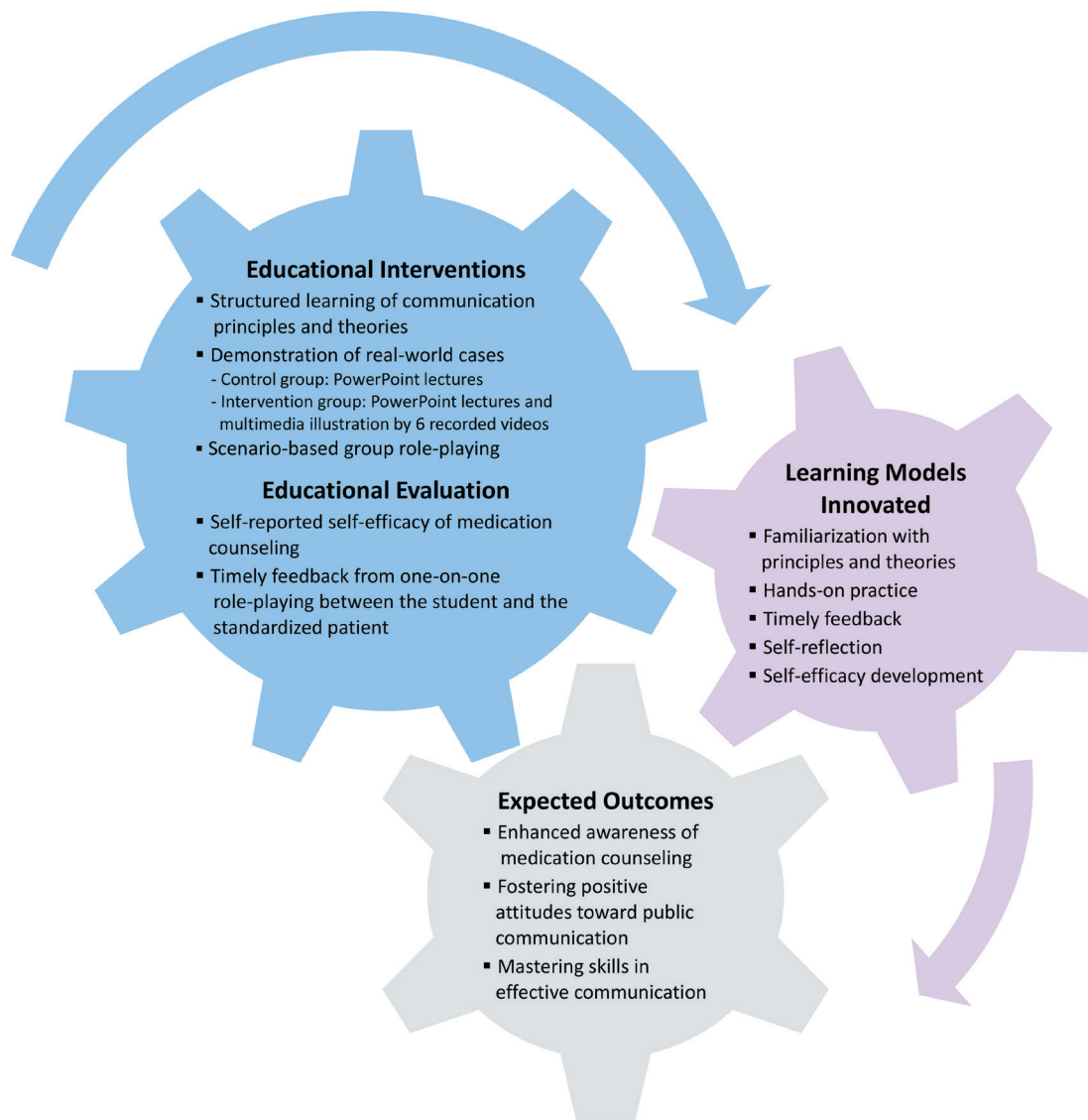


Figure 1 The conceptual framework of course design, learning models and expected outcomes.

approach consists of five steps to provide structured counselling by identifying and fulfilling patient needs, including surfacing symptoms and OTC needs, inquiring about allergies and medication histories, reaffirming medication indications, directing correct medication use and reiterating strategies to empower self-care.²⁹ We ask whether and how the blended multimedia teaching approach improves self-efficacy and communication skills of the learners. **Figure 1** depicts the conceptual framework of course design, the learning model and the expected outcomes of the study.

METHODS AND ANALYSIS

A two-cohort comparative study using survey and checklist will be performed to compare the effects of the conventional lecture-based approach against the blended multimedia approach on communication self-efficacy and skills among third-year undergraduate pharmacy students.

Study design and the intervention

This study will be conducted with two successive cohorts (class of 2025 and 2026) when they are in the third year of the 6-year pharmacy curriculum and enrolled in the Introduction to Community Pharmacy course, termed the control and intervention cohorts, at the National Taiwan University. While taking the Introduction to Community Pharmacy course, students must have also enrolled in the requisite non-prescription drugs course, which teaches the knowledge of functions and products of OTCs commonly available in community pharmacies. The course of interest, Introduction to Community Pharmacy, is a 16-week, two-credit preparatory course for community pharmacy practice experiences and is required for all pharmacy majors. The course comprises three sections, including the history and current practice in community settings (first 6 weeks), medication counselling and communication in the pharmacy (the following 4 weeks), and engaging pharmacy services in

public health (the last 5 weeks), in addition to the final assessment. This study will focus on the 4-week section of medication counselling and communication in the pharmacy. The major differences in the teaching materials between the control and intervention cohorts are the modes of delivery of the SAIDS approach to OTC counselling, and the remaining teaching materials will be the same between cohorts. For the control cohort (ie, class of 2025), the 4-week section begins with a 3-week introduction to professional communication skills focusing on OTC medication counselling. The instructor will present the content in a conventional approach by giving 3-week in-class lectures and focusing on (1) tips for communication and interpersonal relationships, (2) identification of individual needs and differences for provision of tailored medication counselling and (3) application of individualised medication counselling in pharmacy practice. Most of these materials will be presented in plain text and still images in PowerPoint slides.

In the fourth week, the instructor will use PowerPoint slides-based lectures to introduce the SAIDS approach to OTC counselling and then provide students with six real-world cases to facilitate their hands-on practice through group discussion and in-class role-playing. The scenarios will include (1) recommending patients with proper OTCs, (2) helping patients use OTCs appropriately and (3) identifying and servicing patients who are prone to misunderstand the use of OTCs. Each scenario will be exemplified by various dosage forms (eg, oral and topical) and OTC therapeutic classes (eg, analgesics and gastrointestinal products).

Students in the intervention cohort (ie, class of 2026) will be those enrolled in the Introduction to Community Pharmacy course in 2023. They will receive three lectures in class, watch videos of scenario-based OTC consultation and have group role-playing activities of OTC counselling. In addition to the conventional approach for the control cohort, students of the intervention cohort will have the opportunity to learn counselling skills through multimedia learning-inspired materials at their own pace. In short, the instructor will play six scenario-based videos to demonstrate how to integrate the SAIDS approach into OTC counselling. These videos will be prerecorded based on the scenarios of the six real cases presented to the conventional cohort. Each video will last 3–5 min to describe the counselling process. The recorded videos will integrate video featuring actors, audio (eg, patient–pharmacist conversation), and closed caption, thereby accurately illustrating the complex and dynamic medication consultation services in community pharmacies. The instructor will facilitate follow-up discussions in class on linking the SAIDS approach to providing appropriate OTC counselling. The teaching materials for both cohorts will be uploaded to an institutional web-based learning management system (ie, NTU COOL), so students can review these materials at their convenience.

Sampling strategies

Figure 2 shows the student enrolment scheme for the control and intervention cohorts. To ensure adequate statistical power, a priori power analysis was performed for a multiple regression test with three predictors using G*Power 3.1 with power of 0.80 and two-tailed $\alpha=0.05$.³⁰ A sample size of 77 participants was required to reach a medium-sized effect ($f^2=0.15$), and a larger sample size will give greater power to detect the effect of the intervention.³¹ Eligible students will be those who take Introduction to Community Pharmacy and provide informed consent. Since the outcome measures are part of mandatory course evaluation, students who do not provide informed consent will be required to take the evaluation, but their data will be excluded from the analyses.

Measures

Students' self-efficacy in OTC counselling will be assessed using a validated 14-item scale (online supplemental appendix 1).^{7 32 33} Students will be asked to indicate their level of confidence in each step of the OTC counselling assessment needed for patient evaluation and information delivery. Each item is measured on a 5-point Likert-type scale (1=not confident at all, 5=highly confident); items are summed up with a total self-efficacy score ranging from 14 to 70, and a higher score reflects greater confidence in addressing key steps of medication counselling. This self-report survey will be administered in the first week of the semester and again 1 week before the final.

Students' competence in communication skills will be evaluated using a 20-item checklist (online supplemental appendix 2) adopted from existing literature^{7 32 34} as part of the final structured summative assessment (ie, scenario-based evaluation of OTC counselling). Each item addresses one element that must be performed during counselling practice and measured using a yes/no option. In the final, each student will undergo a scenario-based evaluation through one-on-one OTC counselling with a simulated patient. The evaluation will last 10–15 min, and each student will be asked to tailor the counselling section to the patient's needs according to the SAIDS procedure. Eight trained pharmacist evaluators will play the simulated patients and provide personalised counselling feedback immediately after the evaluation. These evaluators will check if the students' performance meets the respective item on the checklist. One point will be given if an item criterion is met, and a higher total score indicates a greater competence in using the SAIDS approach in the simulated scenes. A passing score will be set at 14/20 to determine if a pharmacy student meets the minimum acceptable criteria for providing OTC counselling.³⁵

Data management and analysis

Frequency distributions and descriptive statistics will be used to summarise the characteristics of the study participants and their responses. Paired t-tests will be performed to compare the pre-and-post difference in the mean total score of self-efficacy within each cohort. An independent

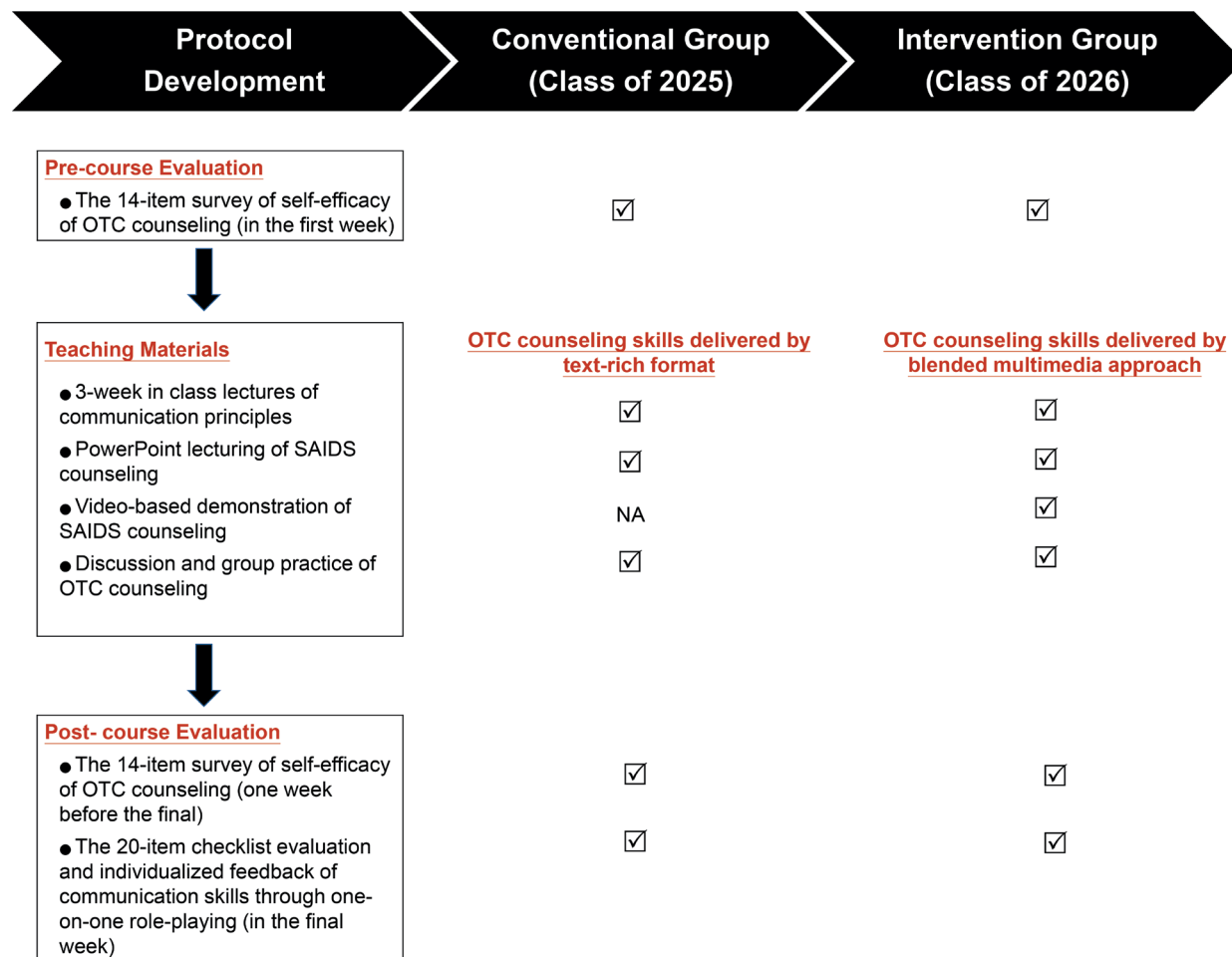


Figure 2 The enrolment scheme of the study cohorts. OTC, over-the-counter; SAIDS, Symptom-Allergy-Indication-Direction-Self-care.

t-test will be conducted to compare the differences in the mean total score of self-efficacy between the two cohorts. A linear regression model will be performed to compare the differences in the mean total score of the communication skills scale between the two cohorts and identify factors that may predict the performance of the students' communication skills, after controlling for associated covariates (ie, sex, age, work experience in a community pharmacy, previous OTC counselling experience prior to the course). All statistical analyses will be performed using SPSS V.28, with the level of statistical significance at a two-sided $p < 0.05$.

Patient and public involvement

Participants and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

Ethics and dissemination

The study protocol has been reviewed and approved by the Research Ethics Committee at the National Taiwan University Hospital (202109017RIND). Participants will be informed of the purpose of the research and assured of the anonymity of their participation. Each participant will receive a study information sheet that outlines the

study process and expectations in plain language. Written informed consent will be required for each eligible participant prior to enrolment. The data collected will be encrypted and password protected according to institutional standards. All procedures will be performed in accordance with the Declaration of Helsinki. The study findings will be not only presented in conferences and journals of pharmacy education but also shared with educators to inform future curriculum development to improve the medication counselling skills of pharmacy students.

DISCUSSION

This study will develop videos based on real-world cases to impart the structured OTC counselling approach (ie, SAIDS) and advance pharmacy education in two aspects: scientific outcomes and practical impacts. For one, the study results will contribute to the pedagogy of professional communication skills in a pharmacy school. We will understand whether the lecture-based or blended multimedia instructional approach prepares pharmacy students with stronger self-efficacy and better communication skills in OTC counselling. Videos may enable

learners to properly conceptualise rich and dynamic simulated scenarios through streamlining language and wording and matching moving images and audio to align OTC counselling strategies with complex and dynamic social contexts.^{20 25 36} Scenario-based videos are uniquely suitable for preparing students to learn effective communication skills (eg, active listening and empathy), in that learners are prompted to visualise critical yet rather abstract concepts.³⁷ In addition, on-demand videos allow students to engage in the content at their own pace and time. If the blended multimedia approach improves the students' communication performance, further refinement of the course and instruction can be easily envisioned to improve self-efficacy and skills in providing quality pharmaceutical services (eg, medication consultation).

For the other, the instructor is able to compare and contrast the effects of the two teaching approaches and thus calibrate the instruction accordingly. Role-playing with standardised scenarios facilitates hands-on practice and allows timely feedback from the instructor to improve students' confidence and skills in communication through reflection. From a practical perspective, the course has the potential to enable students to be more conscious of the strengths and weaknesses of their communication skills in patient–pharmacist interactions by identifying patients' needs and providing appropriate information to fulfil patients' needs.

Pharmacists who provide walk-in and extended-hour services are among the most accessible healthcare professionals in the community. Preparing pharmacy students with a complete set of effective communication skills is the first step to improving public health by providing professional consultation services, such as medication counselling and the dissemination of self-care knowledge.

LIMITATIONS

The study design presents some inherent limitations. The generalisability of the findings may be limited, since the study will be carried out in a single pharmacy school. Additionally, this is not a randomised controlled study. As such, we cannot determine if the characteristics of the students in the two cohorts will influence their learning outcomes. Future research is recommended to adopt a randomised controlled trial design to confirm the effectiveness and generalisability of the blended multimedia teaching approach on a larger scale.

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