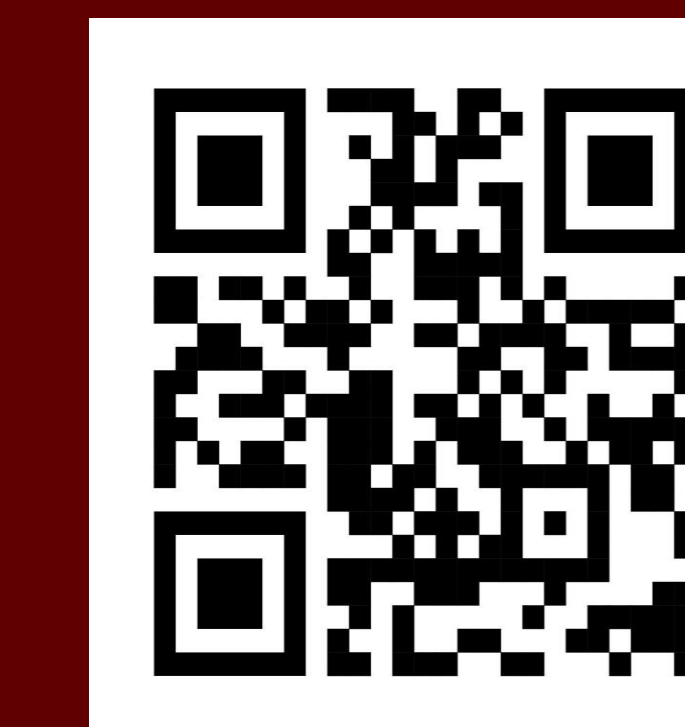


A Systematic Review of Escape Room Gaming in Pharmacy Education

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BACKGROUND

- **The Catalyst:** American Association of Colleges of Pharmacy's 2013–2014 Academic Affairs Committee encouraged faculty to utilize, when appropriate, serious games for learning and professional development.
- **Examples of Serious Games:** simulations, strategy games, puzzles, and role-playing. Recently, one particular serious game that has gained popularity in pharmacy education is escape room games, possibly coinciding with the increase in their social popularity.



- **The Question:** The first published report of an escape game being utilized in pharmacy curricula appeared in 2017, a number of reports have been subsequently published. These articles have shown various benefits to students; however, the full realization of educational benefits and applicability of these activities have yet to be determined.

STUDY OBJECTIVES

- 1 *What does the current literature state about escape rooms in pharmacy education?*
- 2 *What impact do escape rooms have on educational outcomes?*
- 3 *What areas are there for future research?*

RESULTS

Escape Room Characteristics

	Eukel ¹	Cain ²	Clauson ³	Gordon ⁴	Caldas ¹⁰
Student rank	P3	P3	P3	P2 and P3	P3
Content	Diabetes mellitus	Management	Pre-APPE readiness	State/University facts	Nonsterile compounding
Total time	75 min	5 min for instructions 45 min for escape room 10 min debrief	2 h total Preassessment was done 3 weeks before 15 min am care 15 min community 30 min inpatient 40 min debrief 5 min transitions to rooms	2 h total 1 h for the activity, 1 h for intro/presurvey and debrief	40 min
No. of students	83	141	62	127	30
No. facilitators needed	2	3	13	Not reported	3

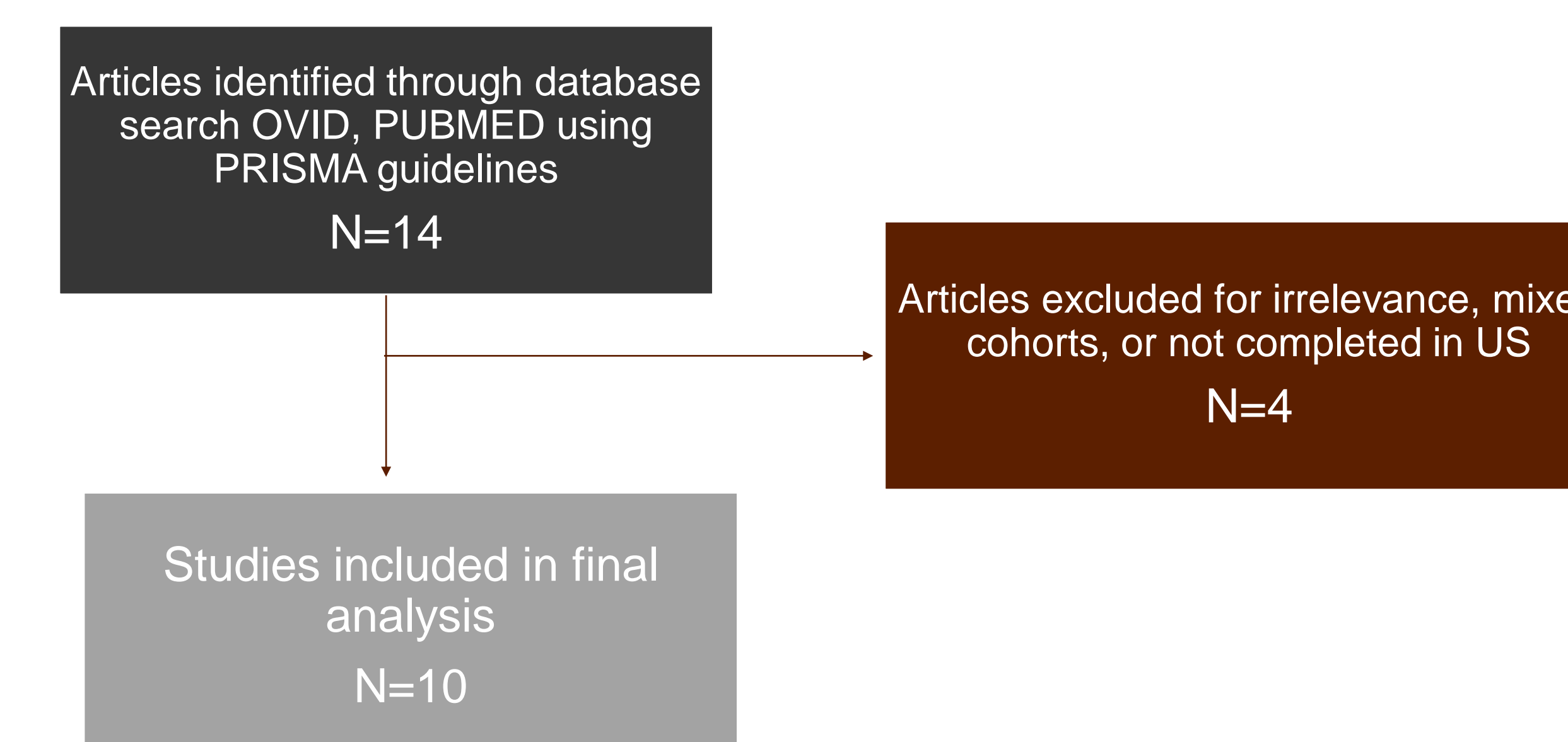
	Nybo ¹¹	Baker ¹²	Plakogiannis ¹³	Nybo ¹⁴	Korenoski ¹⁵
Student rank	P1 and P2	P1	P2	P1	P3
Content	Disaster preparedness	Leadership and teamwork	Heart failure	Curriculum, policies, and procedures of school	Toxicology
Total time	45 min	60 min	1 h for escape room 1 h for debriefing	60 min	Not reported
No. of students	28	146	193	119	22
No. facilitators needed	Not reported	Not reported	Not reported	7	5–7

Escape Room Outcomes

	Eukel ¹	Cain ²	Clauson ³	Gordon ⁴	Caldas ¹⁰
Primary outcome	Change in knowledge from pretest and postassessment	Student perceptions	Change in knowledge from before and after assessment	Change in perceptions from before and after surveys	Change in knowledge and student perceptions based on before and after assessment
Results	Students' mean perception showed a statistically significant increase in the mean value of the evaluation scale	91% (n = 126) of participants were more engaged in thinking about the problems and 89% (n = 123) enjoyed the escape room more.	Students scored 3 points lower on the postassessment (-2.8 ± 13.4). However, 96% of students (n = 51) felt that the exercise improved clinical skills and facilitated learning.	All but 1 statement ("I am an integral member of the team") showed a statistically significant increase in those strongly agreeing or agreeing pre to postexercise. The largest shift was seen for the statement "I enjoy working in a team environment".	Students' knowledge improved or stayed the same for all of the assessment questions. Students perceived the escape room as helpful to their learning
Time to develop escape room	~20 h	Total, including delivery = 18 hrs and 45 min	Not reported	Not reported	Not reported

	Nybo ¹¹	Baker ¹²	Plakogiannis ¹³	Nybo ¹⁴	Korenoski ¹⁵
Primary outcome	Group readiness assessment tests in the scenario and individual readiness assessment tests after the completion of the activity.	Change in retrospective post-then-prelab questionnaire of student-perceived knowledge & perceptions	Change in student perception from immediately at the end of the activity, to 4 weeks after the activity.	Assess student attitudes	Before and after assessment on knowledge and student self-perceived confidence
Results	Student performance was higher on the initial attempts of 3 group readiness assessment tests (88 ± 16.0%, 82 ± 7.1%, 78 ± 12.0%) than in the final individual readiness assessment test (73.4 ± 20.4%). Students found the educational escape room to be enjoyable (95.7%).	Students reported a statistically significant increase in understanding of leadership concepts and application at the end of global lab activities assessment test (P < 0.01) and a majority of the students found the escape room activity "very useful" (56%).	No statistical difference between initial and follow-up surveys. Positive attitudes did not alter over time. Satisfaction levels were inversely related to grade point average (r = -20, P = 0.05)	Students were positively inclined toward the educational activity	Improvements in test scores were observed with both cases' before and after tests (Students improved from 18% to 82% passing on case 1 and improved from 0% to 68% passing on case 2.) Students also found the activity increased their knowledge and level of student-perceived confidence. The majority of students were satisfied with the experience.
Time to develop escape room	32	40	Not reported	40	Not reported

METHODS



Study Identification: Inclusion criteria for the review were original, published in the English language, included only an escape game or format, were completed at a college or school of pharmacy within the United States (US), and/or included only doctor of pharmacy student learners.

Screening & Eligibility: The full-text review was then completed by 2 authors independently. If disagreements arose on the inclusion or exclusion of an article the dispute was settled by the third author.

CONCLUSION

Overall, pharmacy students enjoy escape room activities and the studies showed overwhelmingly positive reviews of the games.

- **Preparation:** Escape rooms require significant time commitment, anywhere from 18 to 40 person-hours. Pilot testing of escape room activity should be an integral part of the preparation for any pharmacy instructor prior to rollout.
- **Content:** Escape room activities have the potential to increase and/or reinforce clinical content knowledge (eg, diabetes pharmacotherapy) and skill development (eg, critical thinking). This is more likely when focusing on a singular content area.
- **Delivery:** Typical group sizes for escape rooms was 5-8 students. Instructors with limited space should consider using electronic delivery of escape rooms. Delivery of the escape room may require additional facilitators (2-13). Lastly, the majority of escape rooms were completed in 1 h.