Investigating the effectiveness of journal clubs in teaching astronomy ...

By Diana Ryder

Introduction

New observational facilities and telescopes lead to more science, knowledge, and papers

- Increased demand for digesting new information

Journal club = an education forum of a group of individuals with the agenda of discussing articles to stay up-to-date with literature

- Reviewing journals has become routine in most universities and institutions as a way of learning things that are not offered in the traditional classroom

Background

Journal clubs are an effective method of cultivating a community of practice (COP)

- COP: a site of individuals that share a common interest and regularly interact as a method of learning
    - Situated learning: learning is achieved through social participation and is possible through acting as a member of a community
- COP components: domain (the shared interest), community (the people involved in a regular engagement or interaction), practice (the shared resources and capabilities being learned throughout the interactions)

Journal clubs are linked to social constructivism, which highlights the importance of social and individual processes combined to form new knowledge

Background

Journal clubs historically started around 1975, in the medical field

Journal clubs help people learn new knowledge through reading the latest literature

- Many astrophysicists have replaced journal reading with regular inspection in arXiv

Sense that the most recently published information is the most important, making preprints important

- Preprint: an unpublished manuscript meant to be published
- One of the most widely used preprint servers is arXiv
- Benefits: usually free and easily accessible, develop critical evaluation skills

Resources: Astrobites (accessible and short summaries of latest astronomy research papers)

Methods

Paper Objectives

- Identify the factors that make a successful journal club
- Assess the journal club at their own university using these factors

2-phase mixed methods research design

- Qualitative phase: determine the success factors (questionnaire + interviews)
- Triangulated, qualitative and quantitative phase
    - See how the factors contribute to the success of journal clubs, by evaluating their own journal club
    - Assess and demonstrate how the identified factors in the qualitative phase are perceived by the participants

Results

Factor	Main theme or point	Number (N)
Commitment	Mandatory or for-credit class	3
	Dedication	3
	Importance of organizer	5
	Lack of commitment	2*
Environment	Casual	5
	Pressure	3
	Food or drinks	7
Content	Diverse topics or platforms	6
	Bias	3
Objective	Importance of purpose	3
	Different goals	4

Commitment

Dedication of the people involved, measure of active participation

Mandatory/class credit

Environment

Overall facade of how the journal club is conducte

Casual, as compared to colloquia or seminars

Results

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Objective	Importance of purpose	3
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Content

The topics which are discussed in each session

Bias: participants frequently choose papers they like or understand perfectly

Objective

Shared goals which everyone can achieve together

Common goals: diversify people's knowledge, improve paper reading, critical thinking, and presentation skills

Results

Commitment

- High enrollee commitment, but large difference between learner types
- Generally low levels of participation

Environment: generally high scores

- Most median scores 4.5+

		Enrollees						Volunteers						Audiences					
Factors	Questions	No.	1	2	3	4	5 Med.	No.	1	2	3	4	5 Med.	No.	1	2	3	4	5 Med.
Commitment	Commitment in attending AC	10	0	0	1	5	4 4.0	8	0	0	4	3	1 3.5	2	0	0	2	0	0 3.0
	Participation during discussion	10	0	2	4	3	1 3.0	8	0	1	3	4	0 3.5	2	0	0	2	0	0 3.0
	How likely to attend AC next semester	10	1	0	1	3	5 3.5	8	0	0	0	2	6 5.0	2	0	0	2	0	0 3.0
Environment (Comfort in the following elements)	Schedule and frequency	10	0	1	2	3	4 4.0	8	0	0	2	2	4 4.5	2	0	0	2	0	0 3.0
	Attending AC	10	0	0	1	5	4 4.0	8	0	0	0	4	4 4.5	2	0	0	1	0	1 4.0
	Presenting	10	0	1	3	3	3 4.0	8	0	0	1	4	3 4.0	0	0	0	0	0	0 0.0
	Reading papers before presenting	10	0	1	3	4	2 4.0	8	0	0	1	4	3 4.0	0	0	0	0	0	0 0.0
	Rotation system	10	0	0	3	2	5 4.5	8	0	0	1	2	5 5.0	0	0	0	0	0	0 0.0
	Using VoxCharta	10	0	0	2	4	4 4.0	8	0	2	4	0	2 3.0	0	0	0	0	0	0 0.0
	Using Facebook Group	10	0	1	2	3	4 4.0	8	0	0	1	3	4 4.5	0	0	0	0	0	0 0.0
Content	Comfort in papers within their field	10	0	0	2	3	5 4.5	8	0	0	0	3	5 5.0	2	0	0	0	1	1 4.5
	Comfort in papers outside their field	10	0	1	7	1	1 3.0	8	0	0	2	1	5 5.0	2	0	0	0	1	1 4.5
	Amount of new knowledge gained	10	0	0	2	6	2 4.0	8	0	0	0	6	2 4.0	2	0	0	0	2	0 4.0
	Is gained knowledge useful?	10	0	1	6	2	1 3.0	8	1	0	0	3	4 4.5	2	0	0	1	1	0 3.5
	Diversity of materials/platforms	10	0	1	5	4	0 3.0	8	0	0	5	1	2 3.0	2	0	0	1	1	0 3.5
Objectives	Are the objectives met?	10	0	0	0	3	7 5.0	8	0	0	0	0	8 5.0	2	0	0	0	1	1 4.5
	Satisfaction rating	10	0	0	0	2	8 5.0	8	0	0	0	2	6 5.0	2	0	0	1	0	1 4.0

Results

Content

- # of papers read increased
- Most participants discuss papers in their own fields
- Low scores in reading papers outside own field

Objectives

- All respondents agreed objectives were met
- High overall satisfaction rating from all learner types

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	Rotation system	10	0	0	3	2	5 4.5	8	0	0	1	2	5 5.0	0	0	0	0	0	0 0.0
	Using VoxCharta	10	0	0	2	4	4 4.0	8	0	2	4	0	2 3.0	0	0	0	0	0	0 0.0
	~~Using Facebook Group~~	~~10~~	~~0~~	~~1~~	~~2~~	~~3~~	~~4~~ ~~4.0~~	~~8~~	~~0~~	~~0~~	~~1~~	~~3~~	~~4~~ ~~4.5~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~ ~~0.0~~
Content	Comfort in papers within their field	10	0	0	2	3	5 4.5	8	0	0	0	3	5 5.0	2	0	0	0	1	1 4.5
	Comfort in papers outside their field	10	0	1	7	1	1 3.0	8	0	0	2	1	5 5.0	2	0	0	0	1	1 4.5
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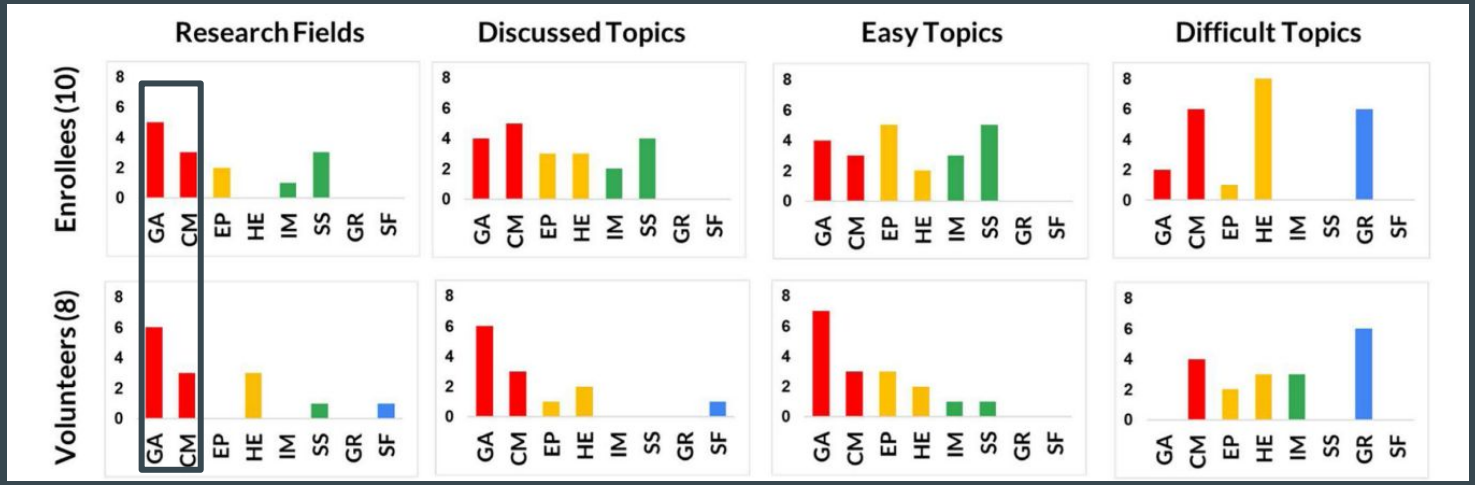
Objectives	Are the objectives met?	10	0	0	0	3	7 5.0	8	0	0	0	0	8 5.0	2	0	0	0	1	1 4.5
	Satisfaction rating	10	0	0	0	2	8 5.0	8	0	0	0	2	6 5.0	2	0	0	1	0	1 4.0

Results

Figure 3: astronomy field coverage

- Low scores in reading papers outside own field (most participants from GA and CM)
- Statistical analysis on Figure 3 data revealed no statistically significant results (small sample size)



GA: Galaxies, CM: Cosmology, EP: Earth & Planetary, HE: High Energy
IM: Instrumentation & Methods, SS: Solar & Stellar, GR: General Relativity, SF: Star Formation

Conclusions/Summary

Paper: investigative study on the factors that influence the success of journal clubs in astronomy and evaluation of university journal club

Results

- 4 important factors: commitment (dedication of organizer(s) and participants), environment (conducive forum for learning), content (topics for discussion), objective (goals)
- Journal club assessment
  - Participants who regularly present papers tend to be more committed to attending
  - Enrollees feel less comfortable in reading papers outside their research field
  - Most participants are biased towards discussing their fields of interest and perceive difficulty in discussing papers outside their fields
  - Most participants feel that the objectives are met (increase in the number of papers being read, and the high satisfaction rating)