Undergraduate Teaching with Multiple Semiotic Resources: Disciplinary Affordance vs Pedagogical Affordance.

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Overview

History of the term affordance
Disciplinary affordance
One example
Pedagogical affordance
Conclusion
Disciplinary meaning making

Interested in the relationship between knowledge and its representation.

Disciplinary meaning is distributed across a range of modes (Lemke 1998, Airey 2009; 2014)
Disciplinary meaning making

Interested in the relationship between knowledge and its representation.

Claim:

Physics forms a perfect playground for semioticians since disciplinary meaning is largely agreed and relatively fixed.
Disciplinary meaning making

View this disciplinary meaning making in terms of disciplinary affordance

Background to the term affordance
Background to the term affordance

Gibson (1979)
Interested in organism in the environment.

_Affordance is an invitation to action that is inherent in the environment_

_Affordance is an inherent property of an object._

A single object has a myriad of affordances depending on the setting and the organism.
Background to the term affordance


Affordance is only that which is perceived by the user.

Affordance is only what a resource affords to one individual, here and now.

This means that affordance changes depending on the individual and setting.
Disciplinary affordance

Introduced the term **disciplinary affordance** for semiotic resources.

Fredlund et al. (2012)
Disciplinary affordance

Definition:

The agreed meaning making functions that a semiotic resource fulfils for a particular disciplinary community.

Airey (2014)
Disciplinary affordance

Radical break with Gibson and Norman.

Focuses on the **discipline’s collective, agreed interpretation** of the resource rather than the individual learner’s experience.

Has potential for education research.
Disciplinary affordance

If each disciplinary-specific semiotic resource has a particular disciplinary affordance

Then

Disciplinary learning can be problematised in terms of coming to appreciate the disciplinary affordances of semiotic resources

Fredlund et al (2012:658)
Disciplinary affordance

The disciplinary affordance of a semiotic resource is shaped by its:

Materiality

Rationalization (carried out by the social group)

Historical anomalies

Airey (2014); cf Mavers *Glossary of Multimodal Terms*
An example of a semiotic resource with high disciplinary affordance

Airey & Eriksson (2014)
An example of a semiotic resource with high disciplinary affordance

*Information highly packed

*High level of usefulness in the discipline

Airey & Eriksson (2014)
Materiality: Colours have meaning.

Rationalization: Both axes!

Historical anomalies: Both axes!

Airey & Eriksson (2014)
What are the disciplinary affordances?

Why does the diagram look like it does?

Need a little history lesson…
Annie Jump Cannon

Born: 1863, Died: 1941
Annie Jump Cannon

Astronomer from Harvard
Catalogued nearly 400,000 stars
Discovered 300 variable stars
First woman to gain a honorary doctorate from Oxford

Worked at Harvard for 40 years but only received tenure two years before retirement.
Annie Jump Cannon

Oh Be A Fine Girl Kiss Me
Annie Jump Cannon

Oh Be A Fine Girl Kiss Me

O B A F G K M
The "colours" of stars (their spectra) were originally classified alphabetically A-Q.

Cannon rationalized the classification to make more sense from an astrophysical point of view.

The original 17 alphabetical categories became seven ordered O B A F G K M.
Brightness

The vertical axis apparent magnitude

Hipparchos (≈150 B.C.)
Six levels:
Brightest: magnitude 1
Faintest: magnitude 6
Stars are at different distances from us.

Astronomers wanted a standard brightness value.

**Absolute magnitude**: how bright a star would be at a standard distance from the Earth.

Kept the original scale
The need for pedagogical affordance
The need for pedagogical affordance

Suggest that students cannot deal unaided with the dense disciplinary affordances of disciplinary-specific semiotic resources.

Need semiotic resources with pedagogical affordance to function as a bridge (Airey 2015)
Pedagogical affordance

Definition:

*The aptness of a semiotic resource for teaching some particular educational content*

Airey (2015); Airey & Linder (in press)
Pedagogical affordance

Semiotic resources that have pedagogical affordances:

• Deal with **less information**
  (reduced cognitive load)

• Often **less abstract**
  (this is something you can ’see’)

• Often have **limited use** in the day-to-day work of the discipline (Airey 2015)
Two related affordances

Disciplinary affordance
*Usefulness for doing the discipline*

Pedagogical affordance
*Usefulness for teaching the discipline*
Pedagogical vs disciplinary affordance

Disciplinary affordance

Pedagogical affordance

Airey (2015)
Summary

Disciplinary Affordance
The agreed meaning making functions that a semiotic resource fulfils for a particular disciplinary community.

Pedagogical Affordance
The aptness of a semiotic resource for teaching some particular educational content

These two are often in functional opposition
Thanks for listening!
References


