Multimedia Learning Principles and Instructional Design Among Teachers: A Pilot Study

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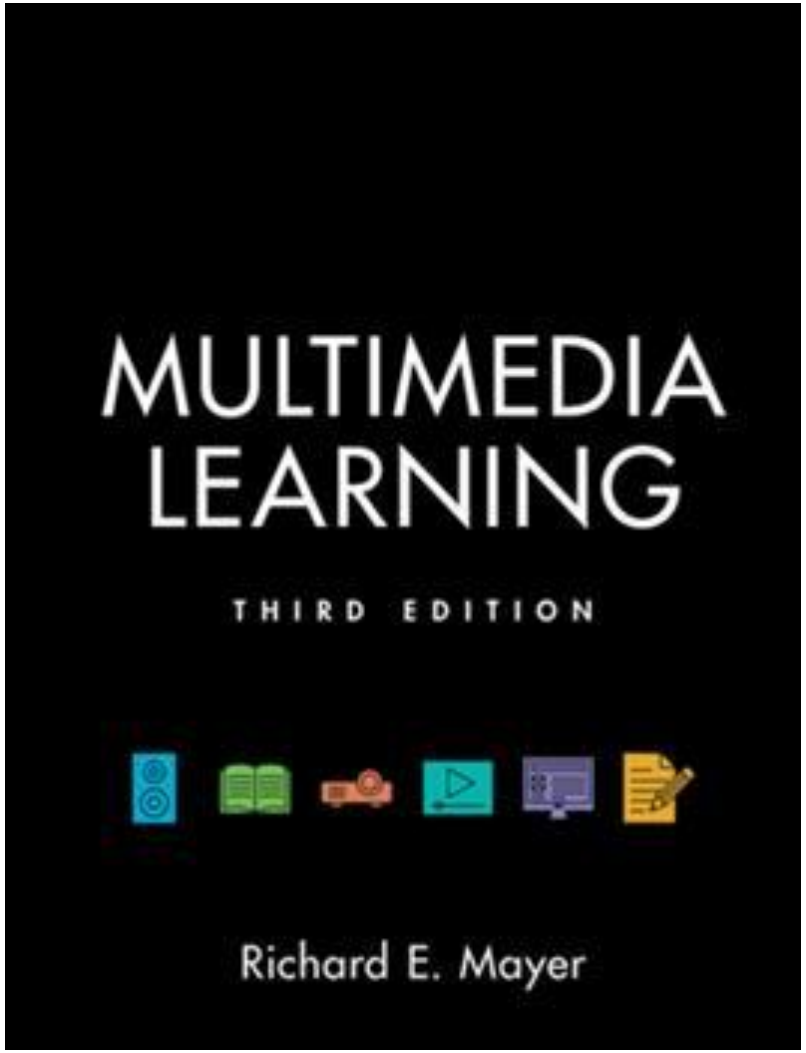
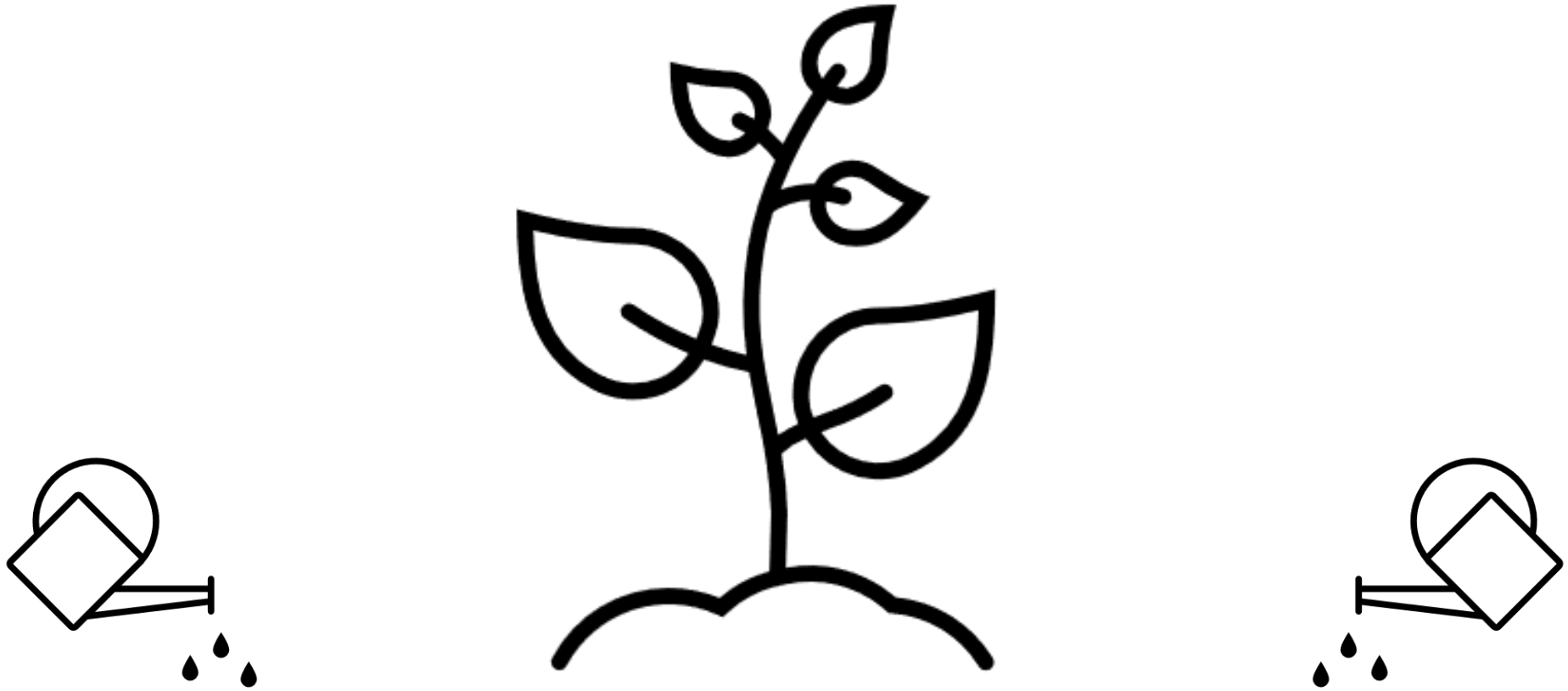
PowerPoint

Cognitive Theory of Multimedia Learning (CTML)





Cognitive Load Theory (CLT)

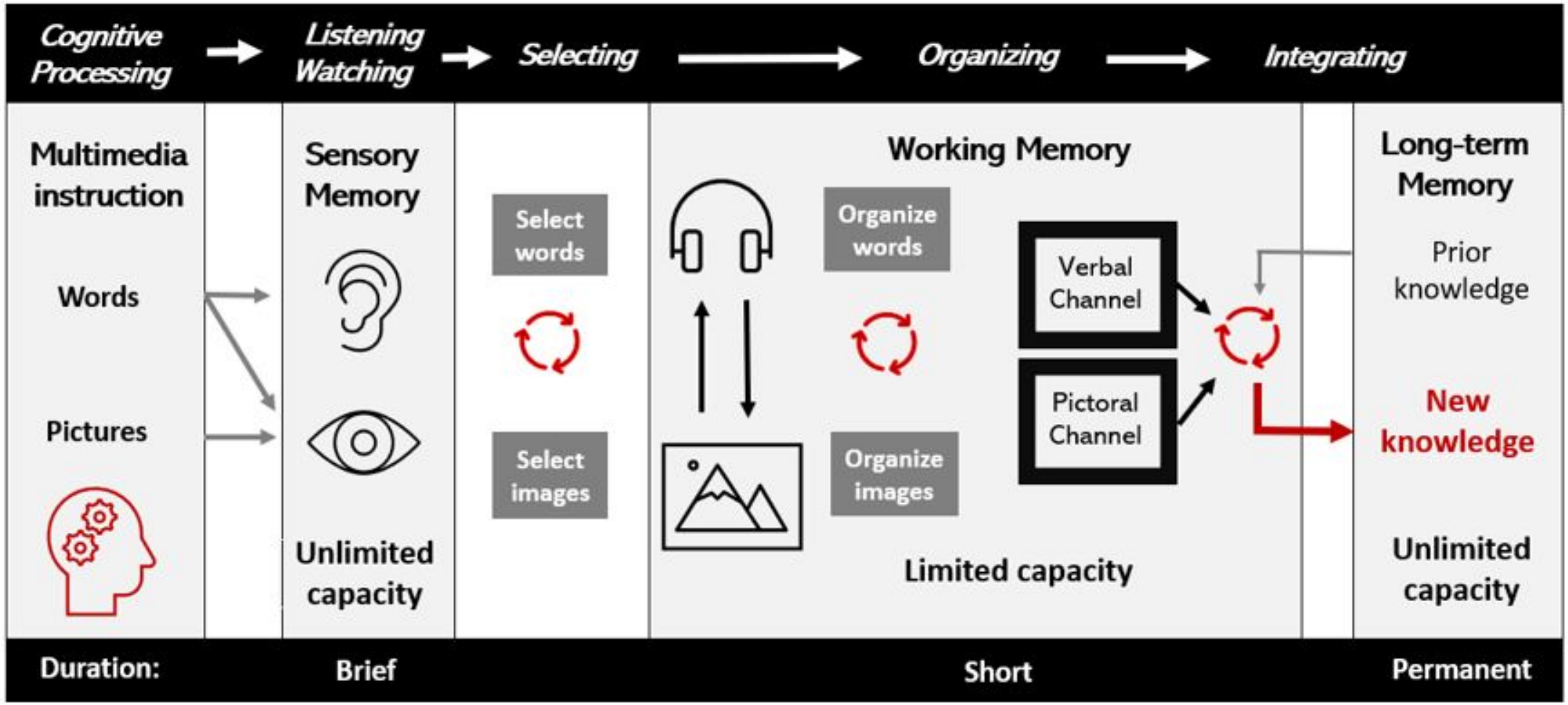
Working Memory Theory (WM)

Phonological loop

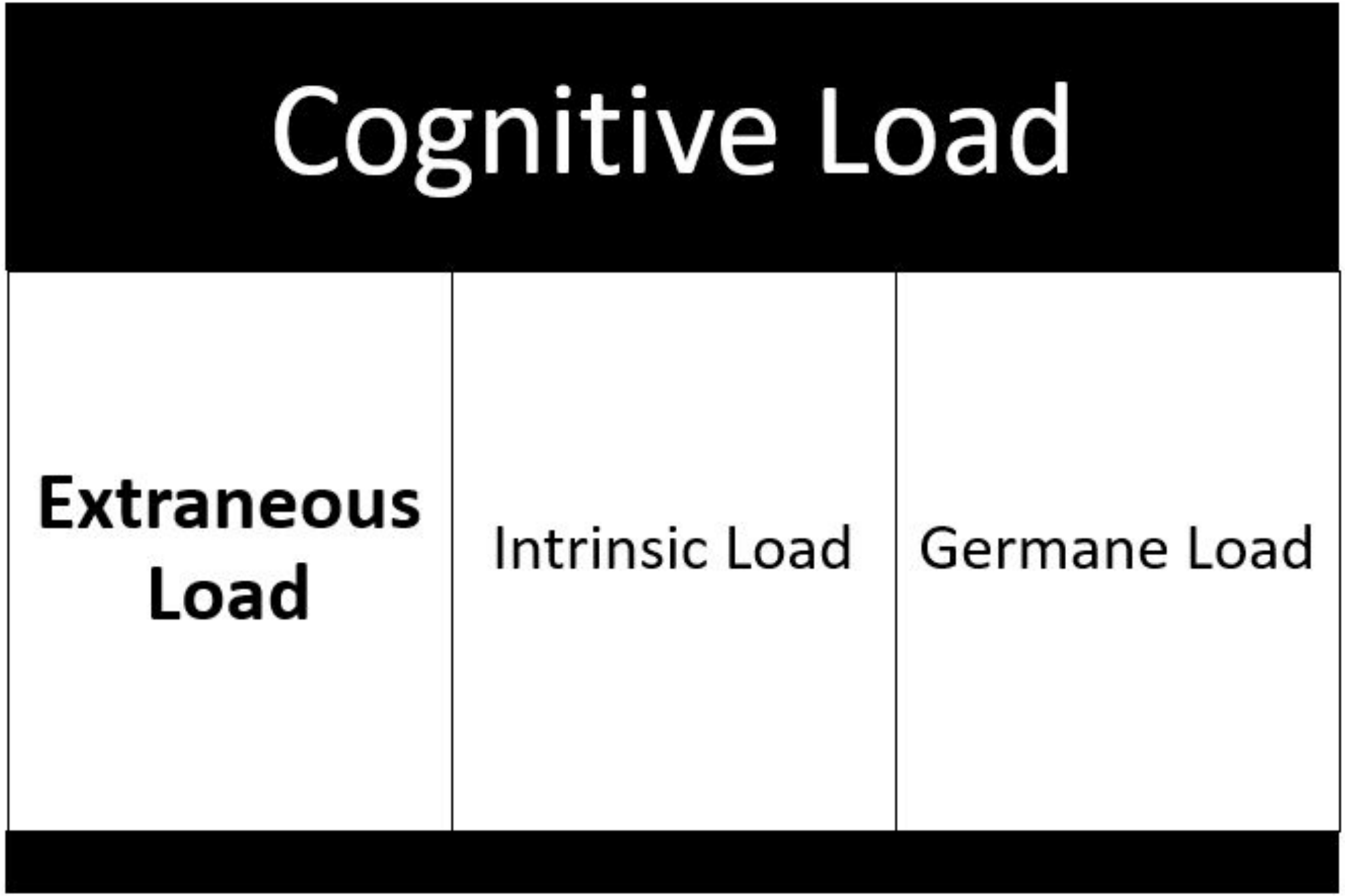
Organize

Visuospatial sketchpad

From Multimedia Presentation to Long-Term Memory



Note. Adapted from Mayer, 2021.

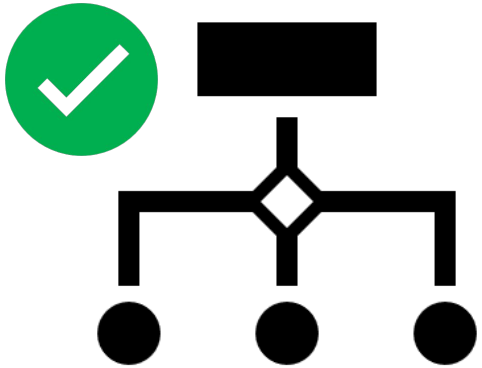

Cognitive Load
Extraneous Load
Intrinsic Load
Germane Load

Reduce competition

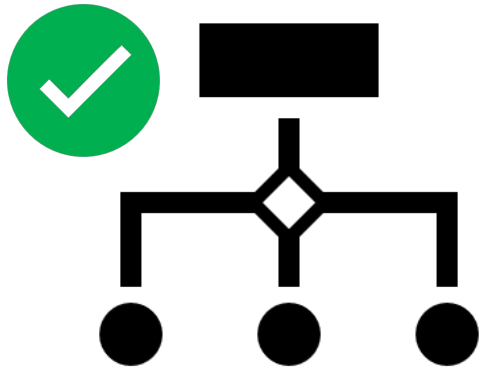
Reduce Extraneous Load

Coherency	Redundancy

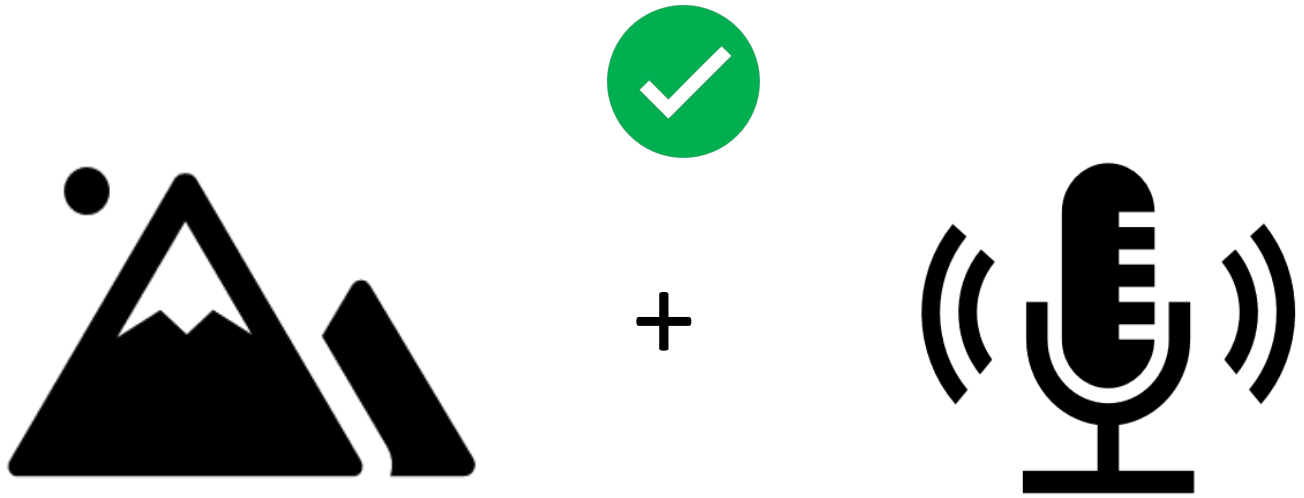
Coherence



Coherence



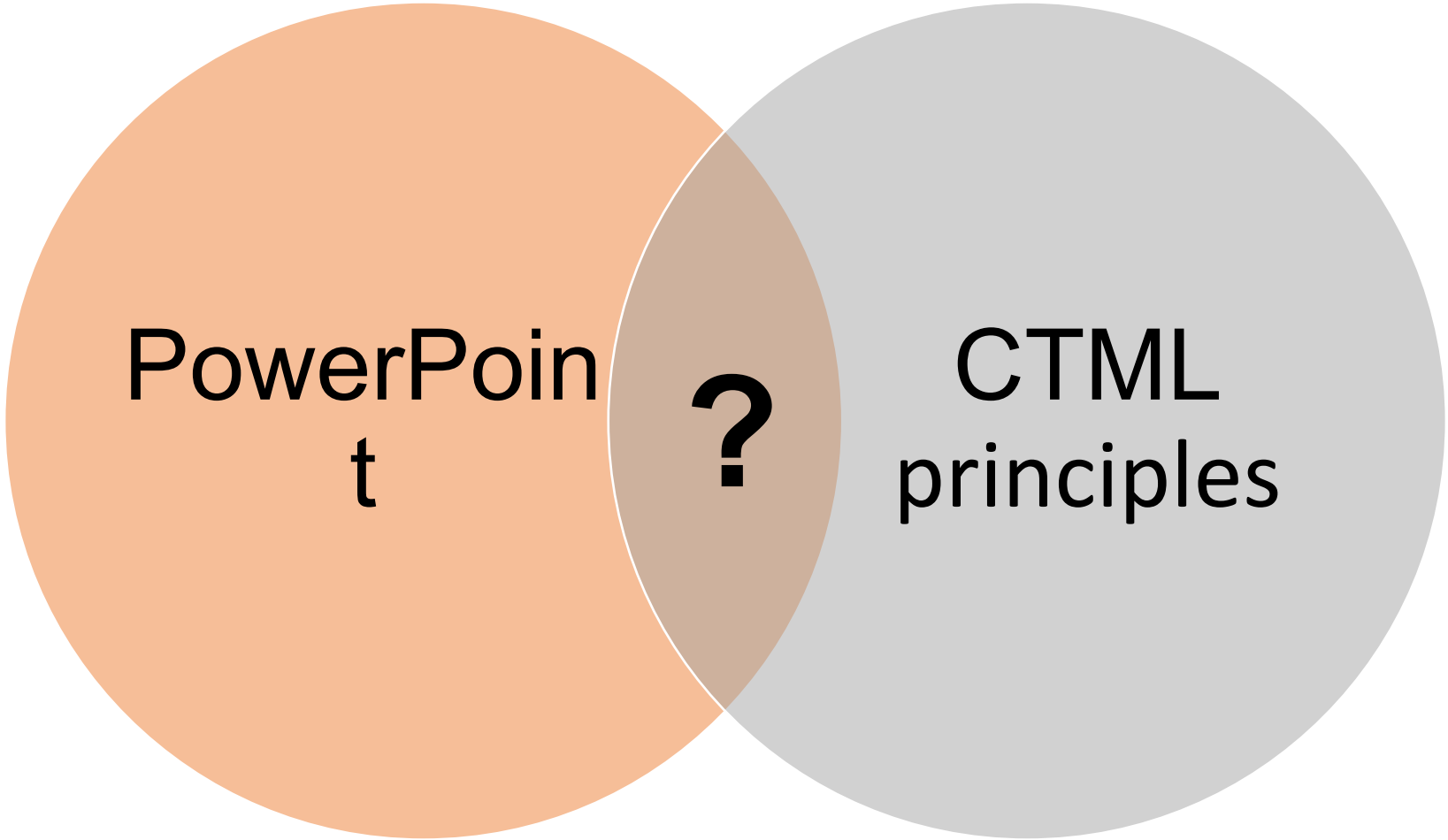
Redundancy

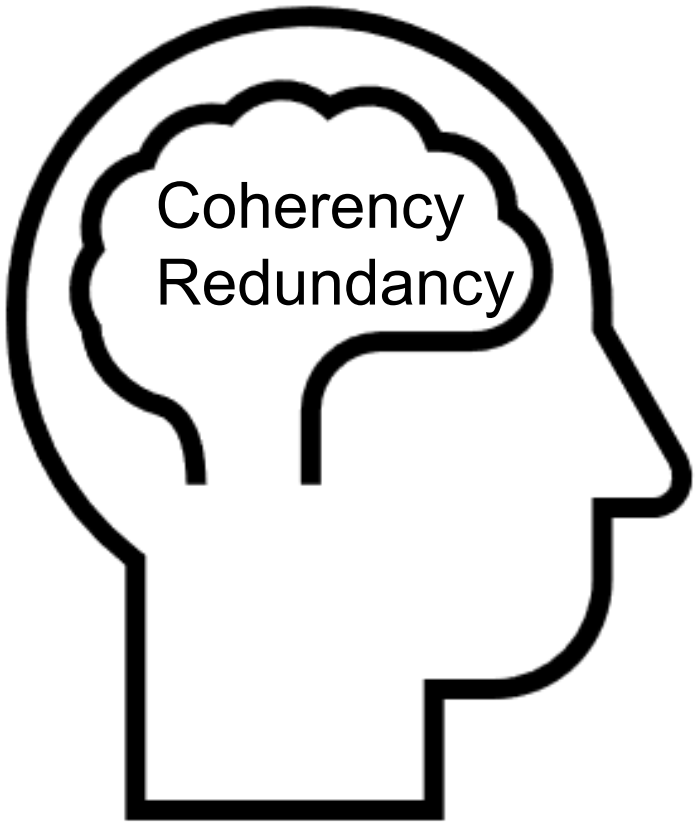


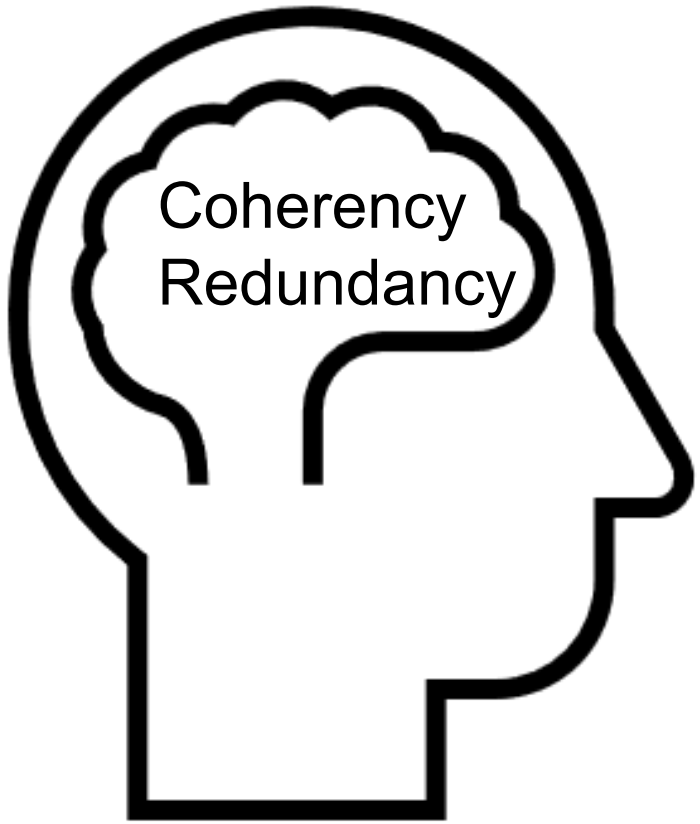
Redundancy

Redundancy

 + mountain


PowerPoint
?
CTML principles


Coherency
Redundancy


Coherency
Redundancy


P

Method and Procedure

Web survey

- Schools
- Social Media
- Professional

Collection

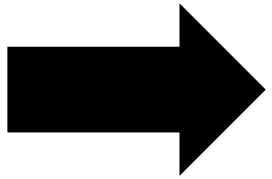
- Qualtrics:
  - Demographic
  - Likert scale

Analysis

- Statistical Package for Social Sciences (SPSS):
  - Knowledge
  - Adherence

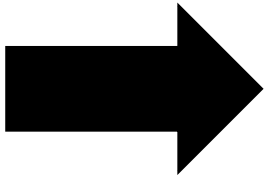
Web survey

- Schools
- Social Media
- Professional



Data Collection

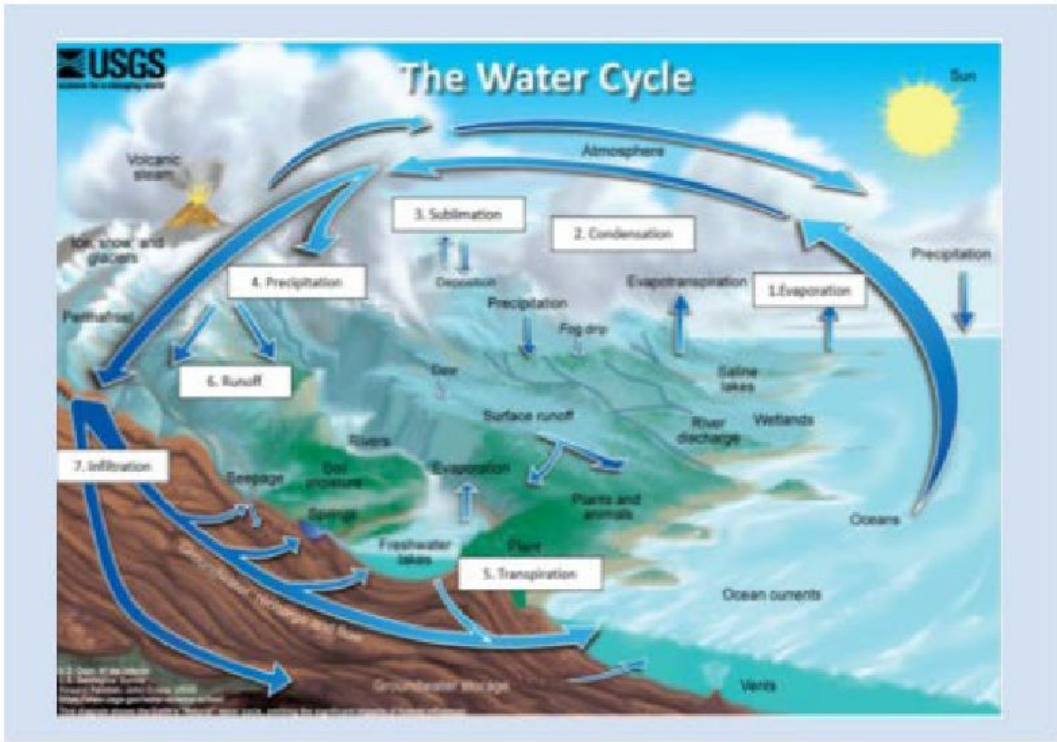
- Qualtrics:
  - Demographic
  - Likert scale

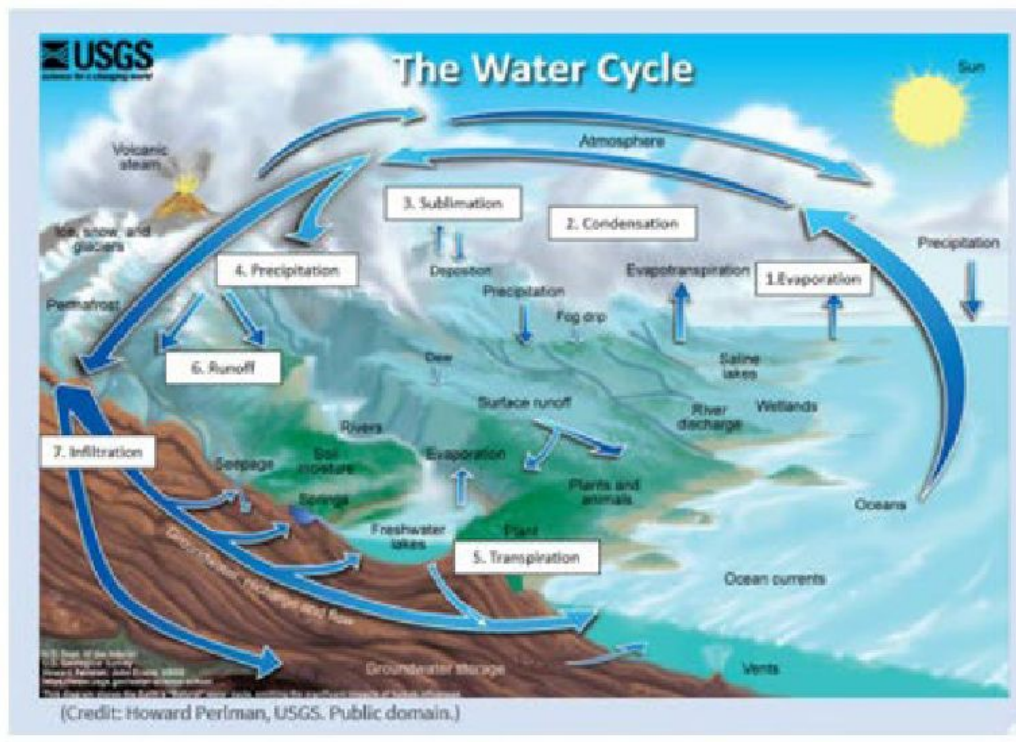


Analysis

- Statistical Package for Social Sciences (SPSS):
  - Knowledge
  - Adherence

Figure 1. Knowledge of the coherence principle choices.





(Credit: Howard Perlman, USGS. Public domain.)

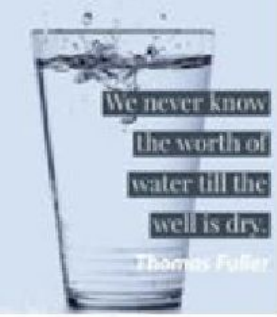
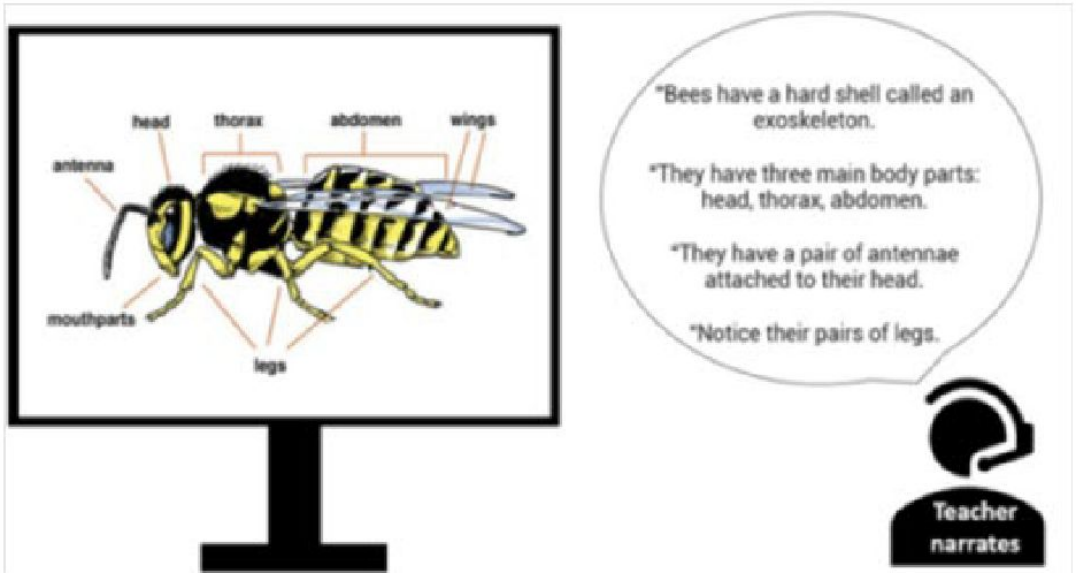
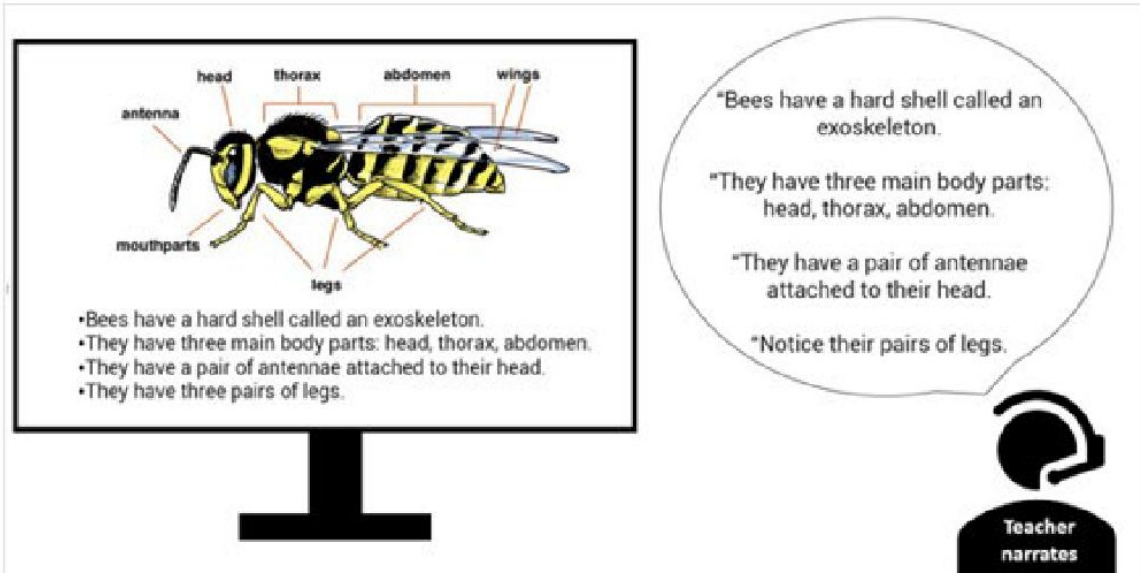


Figure 2. Knowledge of the redundancy principle choices.





Knowledge

Adherence

Results

Teaching Level	*n*	%
Elementary	48	43%
Secondary	44	39%
Post-secondary	20	18%
Total	112	100%

Results

Characteristics	*M*
Age	43.98 years
Years' teaching	15.76 years
Teaching environment*	
Brick-and-Mortar	64%
Virtual asynchronous	39%
Virtual synchronous	57%

* Several teachers had experience in more than one teaching environment

Knowledge

Of the principles

Results

Knowledge of the Coherence Principle Questions			
Question	*Response*	*N*	*%*
Students learn better when interesting but extraneous graphics are excluded.	True	43	38%
	False	35	35%
	I do not know	34	34%
Students learn better when pleasant but unnecessary background sounds are included.	True	10	9%
	False	78	78%
	I do not know	24	21%
The coherence principle states to keep students' working memory from being overloaded, we should eliminate extraneous material from our presentations.	True	59	53%
	False	6	5%
	I do not know	47	42%
From which of the following slides will student learn more deeply? (Water cycle images)	Coherent image	86	77%
	Incoherent image	26	23%

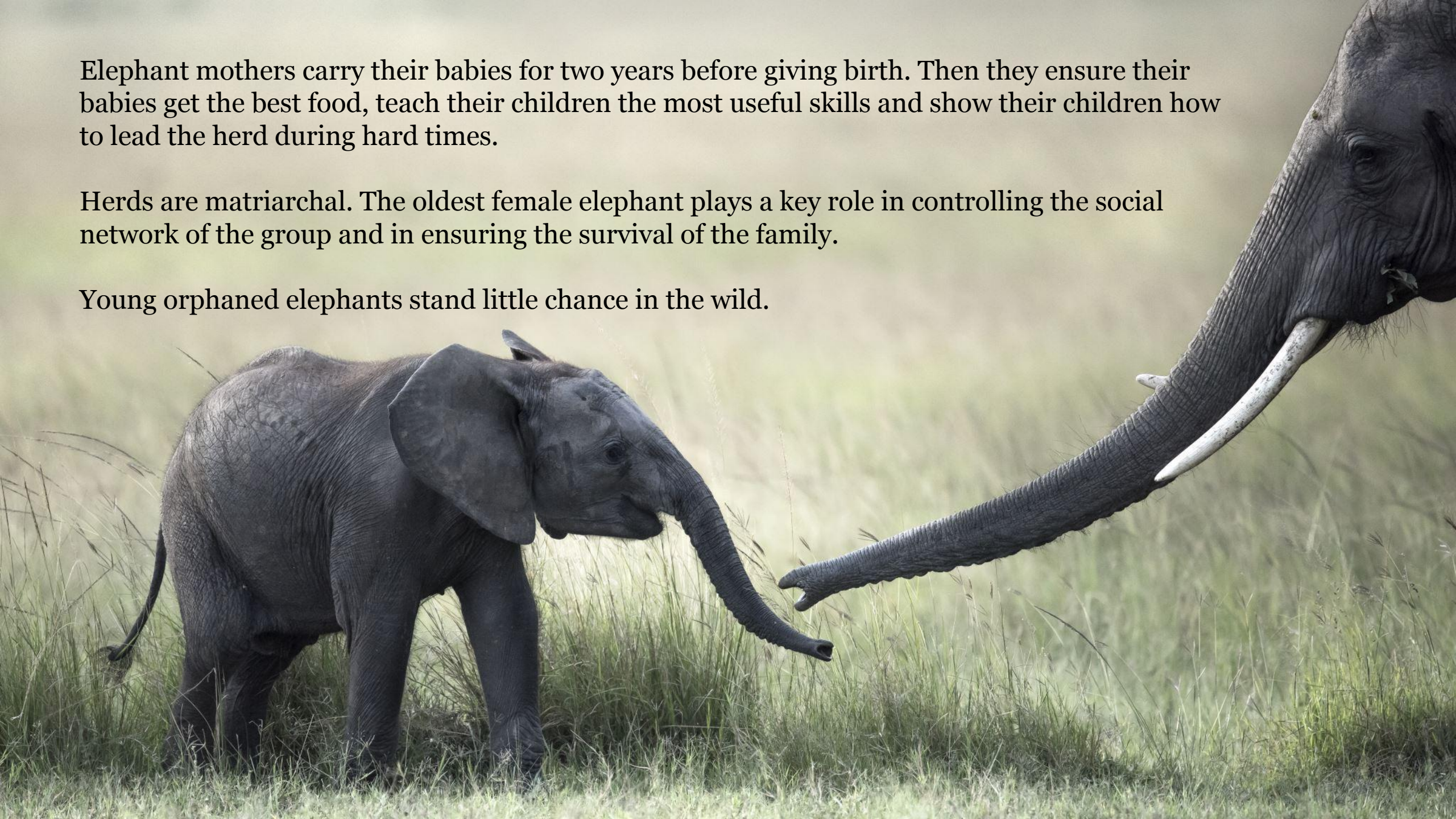
Results

Knowledge of the Redundancy Principle Questions			
Question	*Response*	*N*	*%*
Students learn better when a slide has all three elements: written text + graphics + teacher narration.	True	90	80%
	False	13	12%
	I do not know	9	8%
Students learn better when narration is accompanied by graphics rather than when the teacher narrates the printed text on the screen word-for-word.	True	68	61%
	False	19	17%
	I do not know	25	22%

Elephant mothers carry their babies for two years before giving birth. Then they ensure their babies get the best food, teach their children the most useful skills and show their children how to lead the herd during hard times.

Herds are matriarchal. The oldest female elephant plays a key role in controlling the social network of the group and in ensuring the survival of the family.

Young orphaned elephants stand little chance in the wild.



Results

Knowledge of the Redundancy Principle Questions			
Question	*Response*	*N*	*%*
The redundancy principle states presenters should not read their slides aloud because words we read are processed in both auditory and visual channels, which can cause students to comprehend less.	True	19	17%
	False	33	29.5%
	I do not know	60	53.6%
From which of the following slides will student learn more deeply? (Bee images)	Nonredundant image	57	51%
	Redundant image	55	49%

Adherence

to the principles

Results

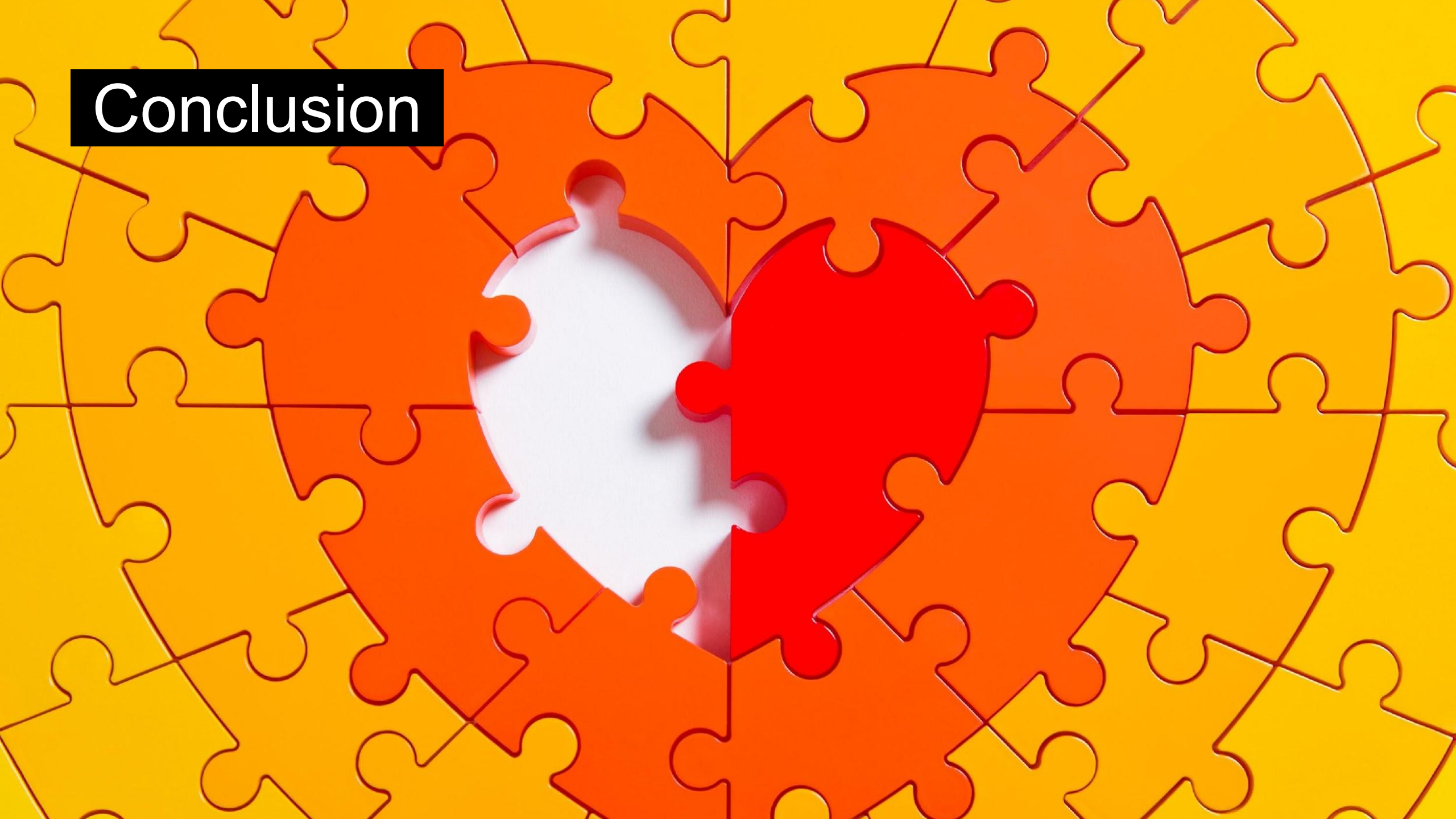
Adherence to the Coherence Principle Questions			
Question	**Response**	**N**	**%**
How often do images on your slides directly illustrate the concept you are teaching?	Always or Most of the time (high knowledge)	92	82.1%
	Sometimes or never (low knowledge)	20	17.9%
How often do you include several images per slide?	Always or Most of the time (low knowledge)	31	27.7%
	Sometimes or never (high knowledge)	81	72.3%
How often do you include entertaining text or graphics unrelated to the content on your slides?	Always or Most of the time (low knowledge)	12	10.7%
	Sometimes or never (high knowledge)	100	89.3%

Results

Adherence to the Redundancy Principle Questions

Question	Response	N	%
How often do you combine an image with a full paragraph or more of text?	Always or Most of the time (low knowledge)	33	29.5%
	Sometimes or never (high knowledge)	79	70.5%
When showing a slide with a full paragraph or more of text, how often do you read the paragraph to the students? *	Always or Most of the time (high knowledge)	75	49%
	Sometimes or never (low knowledge)	57	51%
When showing a slide with a full paragraph or more of text, how often do you give students time to read the paragraph in silence? *	Always or Most of the time (high knowledge)	38	34%
	Sometimes or never (low knowledge)	74	66%

Conclusion



Conclusion

Biography

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Interests: Teacher preparation, multimedia learning, cognitive principles, classical curriculum