Exploring the use of Styles in Educational Instruction and Assessment

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Research Seminar, 11 October, 2011, University of Exeter, UK

Key Aims

- **To provide an overview of the literature on styles research within** education (outcomes of systematic review) Evans & Waring, 2011a)
- **To explore key concepts**
- **To consider the implications for further research and practice.**

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Method

- **Search database:**

  Education Resources Information Center (ERIC) (1999-2010)

- **Initial search key words:**

  Learning style(s) **cognitive style(s)** **approaches to learning**

  thinking styles **intellectual styles** **dispositions to learning**

  learning patterns.

+ **6 Internationally peer reviewed journal special editions:**
  [Educational Psychology (2004); Education & Training (2006; 2008); Psychology of Education Review (2008); Reflecting Education (2009); Multicultural Education and Technology Journal (2009)].

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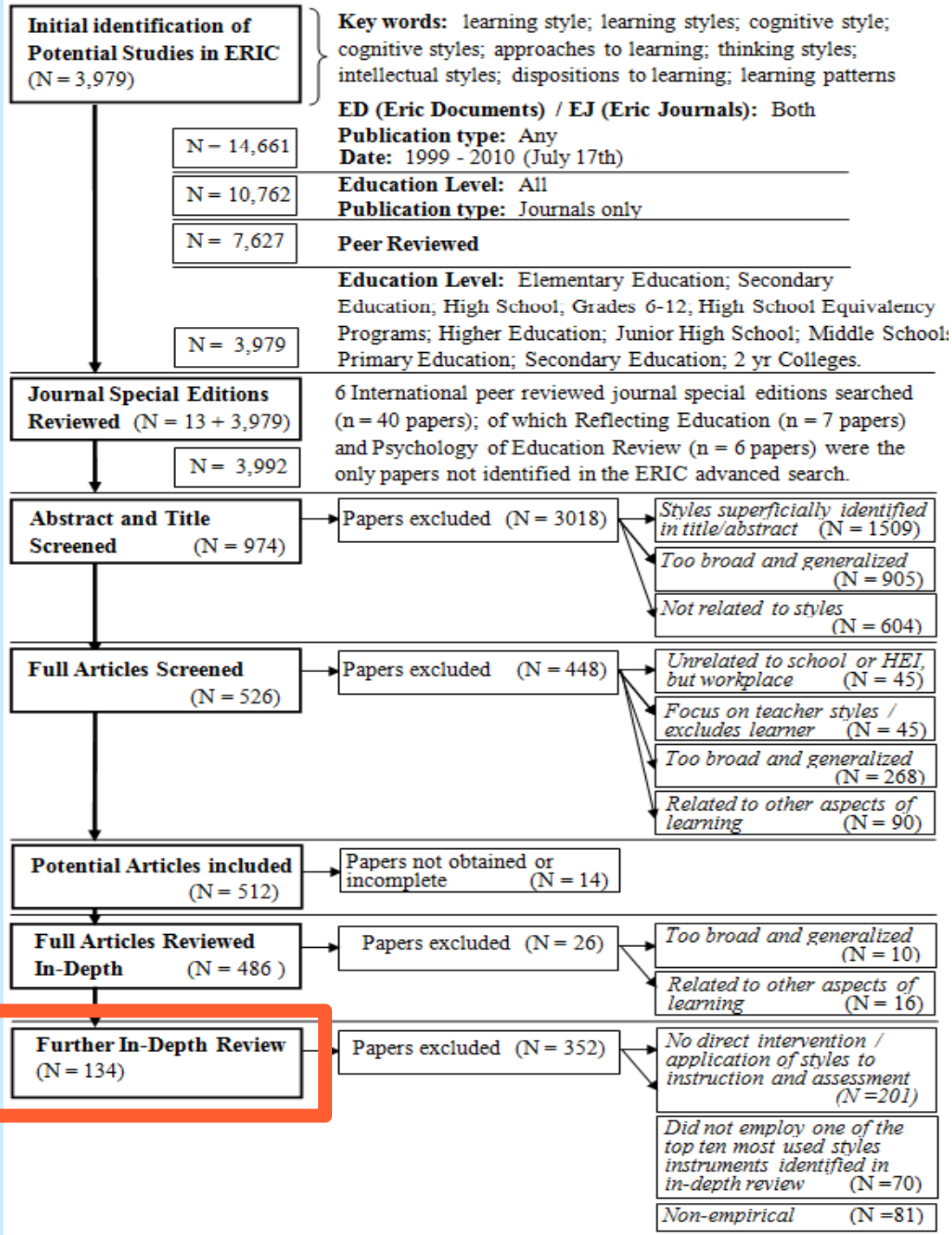
Method

From an initial 3, 979 potential studies, 486 full papers were reviewed; of which 134 were subject to further in-depth review and thematic analysis



Evans & Waring, 2011a

Messick (1976) defines cognitive styles as stable attitudes, preferences, or habitual strategies that determine individuals' modes of perception, memory, thought, and problem solving

Traditionally styles seen as stable; bipolar, unidimensional and non-pejorative

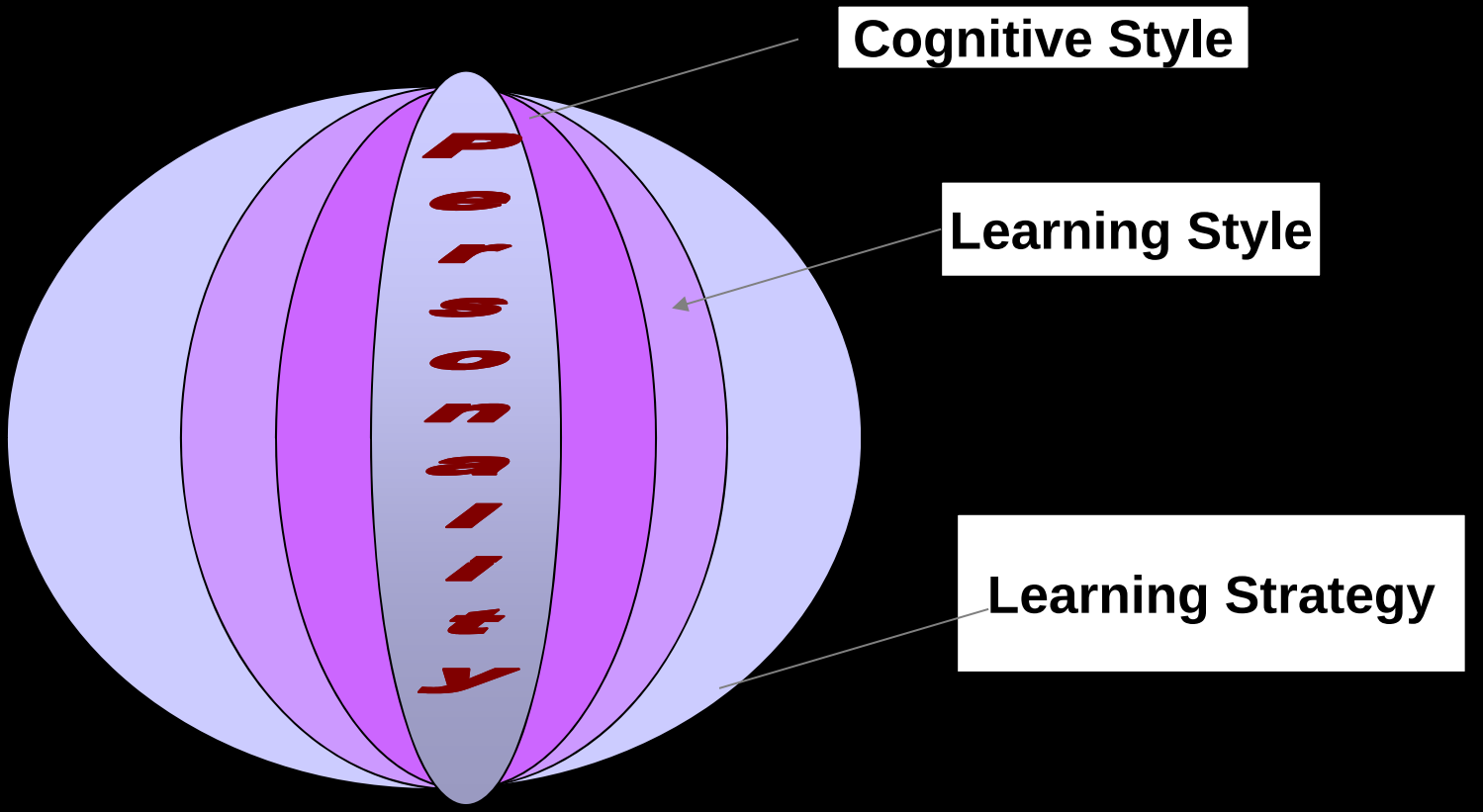
Reinterpretation of styles

“specific modes of adjustment to the external world” (Klein, 1951; Witkin et al., 1962)

“individual differences in processing that are integrally linked to a person’s cognitive system… they are a person’s preferred way of processing… they are partly fixed, relatively stable and possibly innate preferences” (Peterson et al. 2009, 11).

“ontogenetically flexible individual differences representing an individual’s adaptation of innate predisposition to external physical and socio-cultural environments and expressing themselves as environmentally and culturally sensitive neural and/or cognitive patterns of information processing.” (Kozhevnikov, 2011)

A Personal Learning Style



Cognitive, motivational, affective, physiological behaviours & approaches to learning

Cognitive vs Learning Style

same or different?

Cognitive Style Models

Over 30 different models measuring same / different aspects of style:

- CSA: Cognitive Styles Analysis, (Riding, 1991)
- CSI: Cognitive Styles Index (Allinson & Hayes, 1996)
- REI: Rational Experiential (Epstein, 1996)

Learning Styles (over 100 models)

1000s measuring many different things:

(i) LSI, Process of learning *(Kolb, 1976)*

(ii) Approaches to Studying (*Entwistle,1983; Biggs, 1987; Vermunt,1994)*

(iii) Learning Styles Inventory (*Dunn,Dunn,Price 1975-9)*

Key developments

- individuals use different approaches to solve perceptual and cognitive tasks → preferences for these approaches are quite stable and related to intelligence and personality characteristics → Cognitive styles are determined by not only internal characteristics but by external requirements.

- Examination of style relationships (Curry, 1983; Riding & Rayner, 1998; Kozhevnikov, 2007)

- Attempts to conflate the number of styles models (Riding & Cheema, 1991)
- The place of dual process theory (Sadler-Smith, 2005)
- Multidimensional models (Dunn & Dunn,1979; Sternberg & et al., 2001, 2003)
- Styles pedagogy (Evans & Waring, 2009; Nielson, 2008; Rosenfeld & Rosenfeld, 2008)

Overview of findings

- **Evidence of the robust and measured use of strong versions of styles models.**
- **Dominance of HE over school-based studies**
- **10 journals responsible for 30% of output**
- **Dominance of positivistic quantitative (79%), experimental (15%) and cross-sectional designs**
- **Nearly 50% articles from USA and UK** significant research hubs in countries such as Turkey, China (including Hong Kong), Belgium, Netherlands, Greece, and Taiwan are evident
- **Validity and reliability commented on in > 50% of papers.**
- **85% of articles focused on use of 1 instrument**
- **Focus on a small no. of styles instruments and dominance of approaches to learning models. Top 10 models used in 75% of papers**.

Thematic Analysis: *Main themes*

1. Interventions and student approaches to learning (SAL).
2. Style flexibility.
3. Student learning styles and teacher teaching styles.
4. Styles as a framework to enhance pedagogy.
5. E-learning and styles.

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Country of Origin

Country N = 44	% of total articles
USA	29.4%
UK	15.8%
AUSTRALIA	8.02%
CHINA INC HONG KONG	6.1%
TURKEY	5.6%
NETHERLANDS	3.9%
BELGIUM	2.9%
GREECE	2.9%
TAIWAN	2.9%
SPAIN	2.1%
CANADA	2.1%

JOURNAL TYPE / FOCUS

JOURNAL TYPE N = 210	% OF TOTAL
GENERAL EDUCATION	20%
PSYCHOLOGY	15.6%
EDUCATION TECHNOLOGY	10.1%
LEARNING	9.7%
HIGHER EDUCATION	9.5%
TEACHING	9.3%
SCIENCE EDUCATION	8.8%
COMPUTING	6.2%
BUSINESS EDUCATION	1.9%
MEDICINE / HEALTH	3.3%
MISC	5.8%

Dominant Models

Instrument N = 84	Frequency of use of instruments
KOLB (LSI)	14.3%
BIGGS (SPQ)	10.4%
ENTWISTLE & others (ASI/RASI/ASSIST	8.9%
WITKIN (GEFT)	7.9%
FELDER &SLIVERMAN/SOLOMAN (ILS)	6.9%
STERNBERG & others	6.7%
DUNN, DUNN & PRICE (LSI / PEPS)	5.2%
RIDING (CSA)	4.7%
VERMUNT (ILS)	4.7%
GREGORC (GSD)	4.2%

Style Flexibility

Possible to identify "restricted – little change" and "adaptive flexible students" (Mainemelis et al., 2002).

Dilemma 1:

- Is it the nature of provision that enables students to be more willing to adjust their styles (Mainemelis, Boyatzis, and Kolb, 2002; Nijhuis, Segers and Gijselaers, 2008)?

and / or

- To what extent do individuals have control over such flexibility (Cano, 2007; Kozhevnikov, 2007) ?

Dilemma 2:

- To what extent do we adapt instruction to students' styles or encourage style adaptability in students. Are there critical times when certain approaches are more relevant to certain groups of students?

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Learning and Teaching Styles

1. Students and teachers have **preferred styles and their styles matter significantly in their learning and teaching behaviours** (Zhang and Sternberg, 2006).
2. Cognitive styles influence teaching styles but **other influences/ interacting variables may be as important** (Evans, 2004).
3. **Matching**, **in its narrowest sense, is a concept of limited utility in styles research**. (Evans & Waring, 2011a). See Mayer commentary in Learning & Individual Differences special issue (2011).
4. **Matching styles of learner to style of instruction evidence mixed** (Armstrong, 2002, Evans & Sadler-Smith, 2006; Evans & Waring, 2009).
5. **Educational paradox:** students and teachers prefer each other to use Type I styles, however Type II styles contribute to better academic achievement (Zhang, 2011).

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Interventions and SAL

1. **Dominance of SAL group** In HEIs (Vermunt,1994; Entwistle,1997; Biggs, 1999; Gijbels et al., 2008).
2. Interventions to encourage deeper approach often had **unintended effects** with learners adopting more surface approaches (see Evans & Kozhevnikov, 2011; Evans & Waring, 2011a).
3. Identification that some **students more adaptable** than others (Balasooriya et.al., 2011).
4. **Issue of stability of SAL patterns** / dispositions / orientations debates (Richardson,2011; Vermunt & Endedijk, 2011).
5. Role of **contextual and individual** factors highlighted (Papinczak, 2008; Struyven et al. 2006).

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Interventions and SAL

6. The **need to manage student transition** (Campbell, Smith, Boulton-Lewis, Brownlee, Burnett, Carrington, & Purdie, 2001).

7. Identifying and attending to what is referred to as this transition **'time zone' (**Yang and Tsai (2010) - a limited window of opportunity to impact on students' approaches to learning).

8. The need to help students by making them **explicitly aware of the purposes of specific learning activities** (Balasooriya et al., 2009a, 2009b; Ellis, Goodyear, Calvo, & Prosser, 2008).

9. The importance of running workshops to **raise awareness of styles and to effect changes in learning behaviour** (Evans & Waring, 2006, 2007, 2008, 2009, 2011; Kember, Biggs, & Leung, 2004; Kember, Leung & McNaught, 2008; Nielson, 2007; Rosenfeld & Rosenfeld, 2008).

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Styles as framework to enhance pedagogy

1. Need for a clear articulation and understanding of what a styles pedagogy might comprise (Evans & Cools, 2009; Evans & Graff, 2008; Evans & Sadler-Smith, 2006; Evans & Waring, 2011a).

2. Evans and Waring (2009, 2011) through the adoption of a personal learning styles pedagogy (PLSP), have argued a place for styles within pedagogy – this includes assessment.

3. Greater articulation of what using styles in instruction means is needed as well as justification for this.

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Thematic Analysis: E-Learning

1. Not much modification is required to make a significant difference to performance. The degree of cognitive overload is an important variable which may affect certain styles more than others (Ritschoff, 2010).

Proposition 1:

- Development of flexible e-learning environments supports diverse styles (Triantafillou, Pomportsis and Demetriadis, 2003).

Proposition 2:

- Certain cognitive and learning styles may be more affected by e-learning design than others.

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Thematic Analysis: E-Learning

Styles matter:

1. Student outcomes were enhanced when instructional material matched student learning styles using object visual; spatial visual, and verbal cognitive styles (See Kozhevnikov, 2007).
2. The nature of the on-line task did have a differential impact on students with different intellectual styles (Fan & Zhang, 2009).
3. Certain tasks favoured certain styles (Using Riding's CSA: Boles, Pillay and Raj, 2009); Using Witkin's GEFT: Salmani-Nodoushan, 2007).

Thematic Analysis: E-Learning

Issues for learners – focus on FDI:

1. All had difficulty concentrating on **multiple sources** of different information, although field-dependent (FD) learners appear to be more affected by this than are field-independent (FI) learners (Ghinea & Chen, 2003; Handal & Herrington, 2004).
2. **Higher rates of change between clips** (dynamism) had negative impacts on both styles.
3. The **order of materials** matters for FDI (Ford & Chen, 2001; Triantafillou et al., 2003).
4. The **level of complexity** matters in relation to the nature and volume of representations of information.
5. **Patterns of navigation** vary according to FDI (Handal & Herrington, 2004; Somyurek, Guyer, & Atasoy, 2008).
6. **Level of support wanted** varies for FDI (Summerville, 1999; Zheng, Flygare, & Dahl, 2009).

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What's missing?

- Work on gender / cultural differences.
- Work on team development.
- Few qualitative / longitudinal studies.
- Work looking at relationships between different styles models and other ILDs.
- Work on design of assessment and relevance of styles.

What's missing? Assessment

1. Absence of research explicitly considering styles and assessment especially in cognitive styles field.
2. Dominance of articles focusing on complex relationship between assessment and SAL (Byrne, Flood & Willis, 2009; Segers, et al., 2008; Watters & Watters, 2007).
3. Assessment feedback literature places little emphasis on ILDs.
4. Cognitive styles and assessment feedback (Evans & Waring 2011a, b, c)

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Future directions Part 1

1. We need to know more about the role of **styles in performance**.
2. How styles operate particularly within the **broader context of differential psychology** (Moskvina and Kozhevnikov, 2011).
3. Clarity on the **relevance of what styles** in combination with which others for specific contexts. The what and how question.
4. Need for **collaborative research** to help each other improve existing models and instruments, as well as develop common definitions of concepts rather than profligate more models.
5. Need to view **styles holistically working in tandem with other variables** to impact on behaviour and performance.
6. Evidence-informed practice achieved through **rigorous research design, implementation and replication across contexts**.

Future directions Part 2

6. Clear, accessible and informed evidence of what a **styles pedagogy involves**, with and without the use of instruments is needed.

7. Styles approaches can be used as powerful tools in **developing self-regulatory practice**, but more work is needed in this area.

8. **Matching the styles** of the learner to the style of the teacher and vice versa is a **concept of limited utility** considering the complexity of any one individual's styles profile (Evans & Waring, 2009).

9. What we need to identify are those **core principles** that will drive the design and implementation of programmes in schools and HEIs.

10. Styles research has a key role to play in **assisting learners in transitions to new programmes, new curricula design including assessment; and new e-learning opportunities**.

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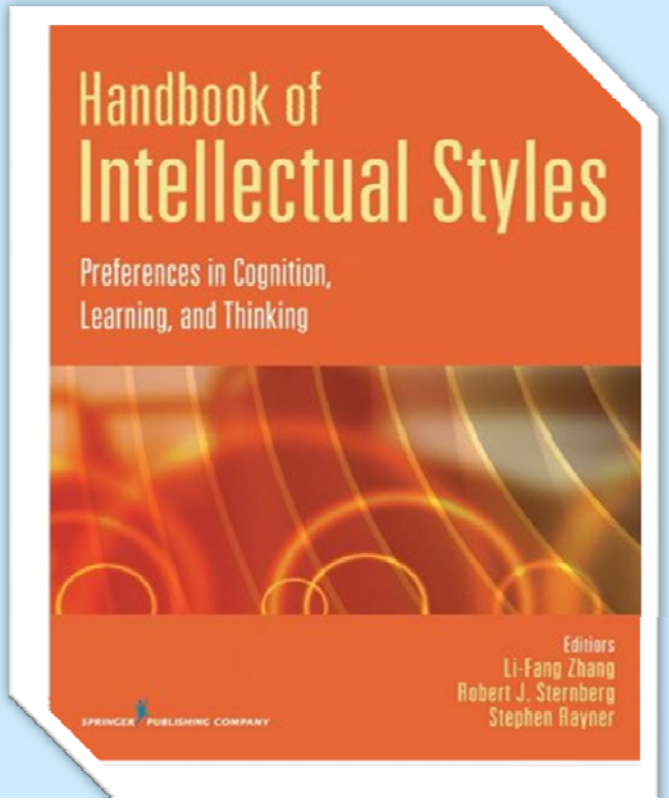
Publication details

Evans, C., and M. Waring. (2011a). Application of styles in educational instruction and assessment. In L. F. Zhang, R. J. Sternberg, and S. Rayner (Eds.) *The Handbook of Intellectual Styles (pp. 297-330). New York: Springer.*

Chapter 15



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