

# The Cognitive Basis for an MR Image Tutor

*M. Sharples, B. du Boulay,  
School of Cognitive and Computing Sciences, University of Sussex,  
Brighton, BN1 9QH, United Kingdom.  
rad@uk.ac.sussex.cogs*

*D. Teather, B.A. Teather, N. Jeffery,  
Medical Systems Research Group,  
School of Computing Sciences, De Montfort University,  
Leicester, LE1 9BH, United Kingdom.  
dte@dmu.ac.uk*

*G.H. du Boulay,  
Institute of Neurology, Queen Square,  
London, WC1N 3BG, United Kingdom.*

**Abstract** A p n n pp o o n σ o p n n n ppo  
n n n n n o o n v n n n on p o o o p ov  
p ov n on n f o o n pp n n n n q n  
n n n p o o p p n on σ n on o σ  
o n σ o p o o p o , p o o o σ on p n , n  
v op n σ o o p o f o v on p -

## Introduction

A p o n v o v n v op n - n v σ , D on f o n v  
n on n n o p o n n n o o σ n n σ o o n n no σ  
n on n n o n n p on n o o p on n o n v if o  
pp n p σ on n n n o o σ ff n o p o n n no n  
p ov n o o w po o o n n o o p on n n o  
p on p on n o o v op on p f wo , n pp op p on n f o  
n p on -  
n n σ o o n o o on w σ f o o p D on f o n v  
v op p on n f o o n o p o o w o w n σ p p o n n p on σ  
n n n o p o n n o p o o w o w o w n σ p p o n n p on σ  
p f p o o -E o p n p on n f o o σ v o σ  
pp n f o o w p op -E o p n f o on o p ov on no  
o n now o f o o p on -E o p n f o on o p ov v w p ov  
n v nno o n p on n , o p on n , o p on n , o  
on o p n w n po n on n w p n -

## Cognitive Support Systems

A on pp o o n σ o f o n n o n now n σ n n on  
o , no pp op f o n σ p σ on p -A n σ n p σ on n n o o  
now n - n w o o σ Co n v n Co p n n n v σ  
w o . - n o o σ , Co n v n Co p n n n v σ  
n o w o w o n v if o n σ n v o n v ppo , w n  
p ov q n σ o n σ o n v o n v ppo , w n

p δ̄ on o n n n o ɔ̄ o p, A - o n v ppo v η̄ o  
n, v op f̄ n ɔ̄ p, A - n p, ɔ̄ oo ppo on ED CA  
o n v ppo f̄ o p, A - n C EC, o p o n p o  
δ̄ p n o q n f̄ o n δ̄ o n v ppo q p n-, pp q o  
T o n T o  
T n n v n v n v n o v ' -  
T p ov ppo f̄ o n n' o n on ɔ̄ own n δ̄ p o  
p, n p n ow o on -  
T o n v o n w o δ̄ n n o w v v v l n  
δ̄ o p f̄ v , n n n w n own n p ov n p o  
v n n f̄ o on n on v p δ̄ p on o p own n  
T n n o f̄ v , p f̄ o n f̄ w l n δ̄ T o op n  
n w o n p n n n nn o po o δ̄ o n -  
wo nv on n -  
-no no on o n v o n nn p n on n op on, o

Explain the terms to be used in labelling the concepts and their attributes (Stones, 1979)

o o po n n o p on n v op Bo  
 n o o on w D on o n v p ov o p n v p on n v op Bo  
 v op o n n p o o o p o n n no v o n n o  
 p n o o n p po -A po on o p n n v on o n w p n n o  
 p n o on own n -An n p n n v on o n w p n n o  
 - n n n n o pp o o po n , n o n n o  
 nno p n -

ar , n  
any sharp  
Gran   
ap  
oun   
Irr u ar  
Ar a sq  
Con or , n to an anato , a atur  
nt r or patt rn  
Ho o n ous  
H t ro n ous  
Contain a l stn t o a stru tur

*g* **E** -A po on *f* p D p on *b* n n o pp n *f* on

non *p on n p*  
*p n o w o n p n p n n p n f o n w*  
*n Bo , w pon n p n n n n f o , n on p n p o o -*  
*p o o n n o n n n n f o , w n o n p n o*

Provide a definition of each concept in terms of its critical attributes (Tennyson and Park, 1980)

C o f o o n o n v o o f o p , n o n n , o o  
 o o n p o n n n o n n o n n o n n o  
 no T n w n n o p o w n n T o o n  
 o p f n on o f w o n v p o v n T o o n  
 n o pp op on-

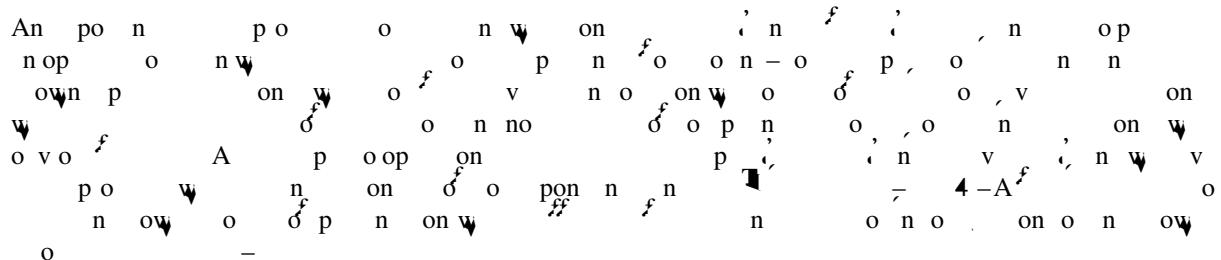
Provide concept maps showing the relationships between concepts (Novak et al., 1983)

—  
n nv n f wo n on p o o v n nov v w f  
p — n q f o pon n n f o n , p ov p p f  
o p — opon n o n wo n on p o n n o p p on p on  
o pon n on f ov on f p n v n f p on p - no p  
v n n n f o n o f p o n p n o on p  
n f o n o f p o n p n o on p  
own o n n n p o n p o pon n n n p ov o v w n n wo f  
o n n n p o f o pon n n n p f w n —  
p ov v w f n n n f w f n n n n on  
o n n p o f , n ow f o f w f n n n n on  
n f o n o f p , n on f on ov v w f n n n n on  
n ow o -An p o f o f n , T o n n n on  
ov v w f o w n f o p -

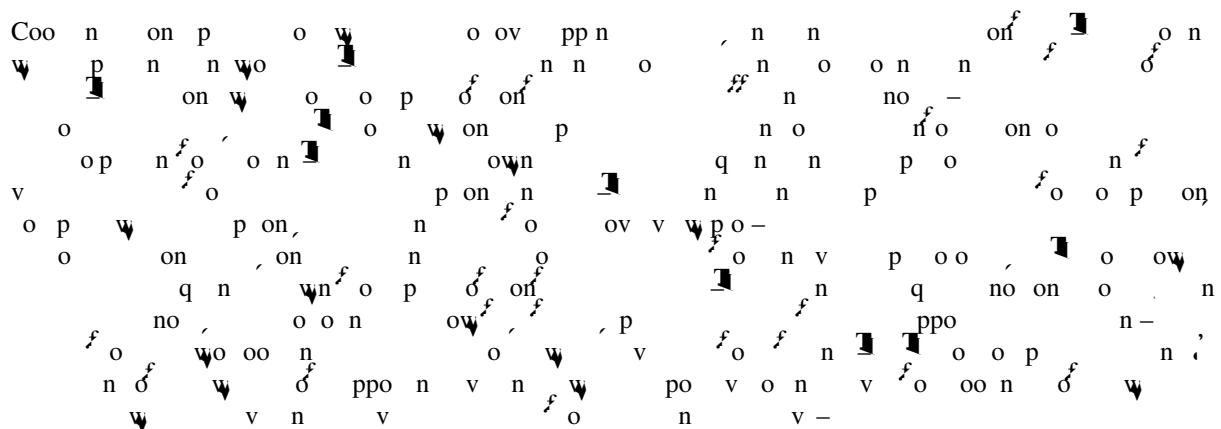
Start by showing a series of simplified exemplar images, with few and obvious attributes, to emphasise the critical attributes (Stones, 1979)



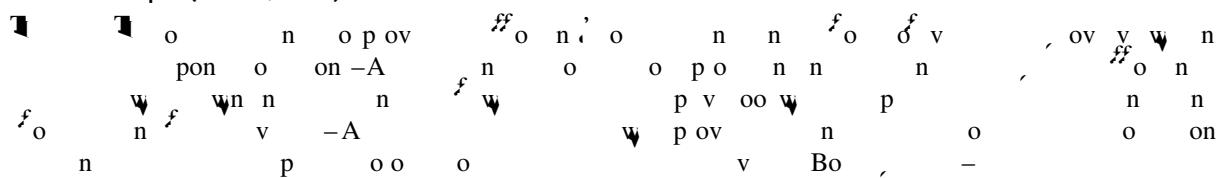
Arrange the exemplars in order from easy to difficult (Tennyson and Park, 1980)



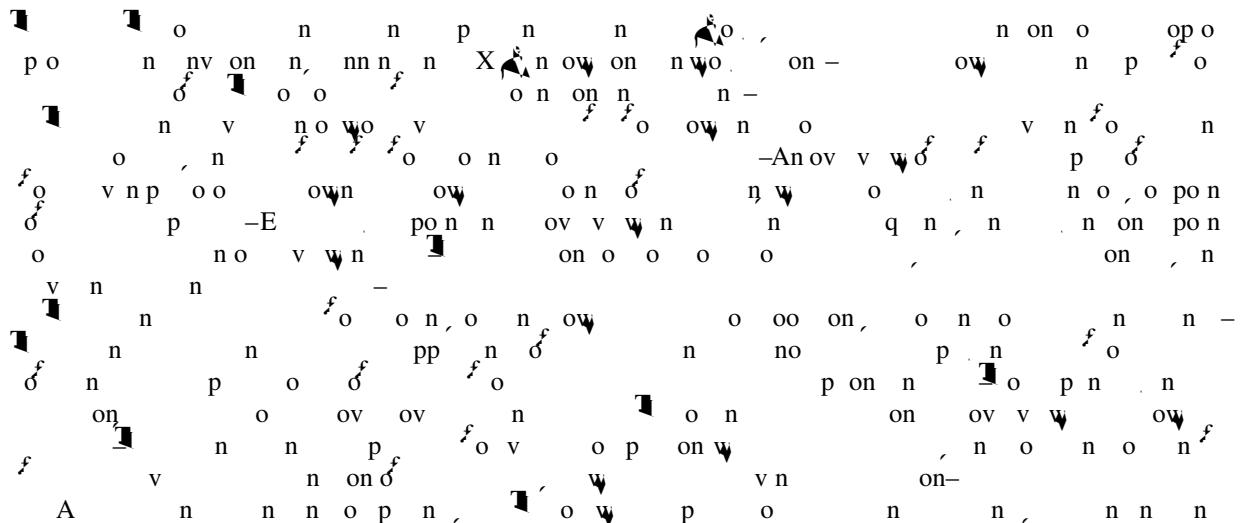
Teach coordinate concepts by presenting examples according to their coordinate relations (Tennyson and Park, 1980)



Provide suitable cueing so that learners gradually become independent in their ability to identify novel exemplars of the concepts (Stones, 1979)



## Implementation



*f* n on **q** pon *f* **q** o o . **w** p n on ' , **w** n v n on o n  
q n n *f* w n , ov v **w** p n ow - op on , o n o pon n o  
A *f* w n -

## Conclusions

D v op *f* o p o n v p oo n on o **w** n **w** o n v  
n n on p o o n n *f* o on o n q *f* o n n n np o o n  
o n on *f* o n *f* o on *f* w , o p n o *f* on p , *f* n p ov p  
pp o n n q n p on **q** n pp o n *f* w n n n  
n n p p no o on *f* **q** n pp o n o o o p  
*f* **q** o n *f* v on p , n o o , o n , n n o , n v n  
p C p o *f* o *f* on on p o n Do on -  
n v *f* o on on p o n n n on o p ov n n *f*

## References

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now, E-<sup>f</sup>o - , B- A- , D- n - , D- E on <sup>f</sup>E p -  
*Rivista di Neuroradiologia*, 4- 4 -
- Do on - , A o Co p <sup>f</sup>o - n - , <sup>f</sup>YAY n .  
D on v - , D on v - , <sup>f</sup>o - n - , <sup>f</sup>YAY n .
- n , -<sup>f</sup> Correspondence Analysis in Practice-A  
v , C-B- n o , E- C o <sup>f</sup> - Annual Review of Psychology , -  
ov , D-Gow n D-B- n o n n - , <sup>f</sup>Con p pp n n now pp n  
w in o oo -  
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on on C p n n -
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Ev on <sup>f</sup> Co p A v o n n p on <sup>f</sup> C D <sup>f</sup> woo , - n <sup>f</sup> o , A-  
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n <sup>f</sup> o , D- B- A- p , -<sup>f</sup> Bo , B- Bo , B- - 4 n n o n  
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**Abstract** A p n n pp o o n σ o p n n n ppo  
n n n n n o o n v n n n on p o o o p ov  
p ov n on n f o o n pp n n n n q n  
n n n p o o p p n on σ n on o σ  
o n σ o p o o p o , p o o o σ on p n , n  
v op n σ o o p o f o v on p -

## Introduction

A p o n v o v n v op n - n v σ , D on f o n v  
n on n n o p o n n n o o σ n n σ o o n n no σ  
n on n n o n n p on n o o p on n o n v if o  
pp n p σ on n n n o o σ ff n o p o n n no n  
p ov n o o w po o o n n o o p on n n o  
p on p on n o o v op on p f wo , n pp op p on n f o  
n p on -  
n n σ o o n o o on w σ f o o p D on f o n v  
v op p on n f o o n o p o o w o w n σ p p o n n p on σ  
n n n o p o n n o p o o w o w n σ p p o n n p on σ  
p f p o o -E o p n p on n f o o σ v o σ  
pp n f o o w p op -E o p n f o on o p ov on n o  
o n now o f o o p on -E o p n f o on o p ov v w p ov  
n v nno o n p on n , o p on n , o p on n , o  
on o p n w n po n on n w p n -

## Cognitive Support Systems

A on pp o o n σ o f o n n o n now n σ n n on  
o , no pp op f o n σ p σ on p -A n σ n p σ on n n o o  
now n - n w o o σ Co n v n Co p n n n v σ  
w o . - n o o σ , Co n v n Co p n n n v σ  
n o w o n f o o n v if o n v on v ppo , w n  
p ov q n σ o n σ n σ n v on v ppo , w n

p ſ on o n n n o o p A - o n v ppo v n o  
n, v op f n A n p Foo n on v ED CA  
o n v ppo o p n C EC o p n o n p o  
f p n o q n f o n f o q p n ,  
p n o n v ppo p n , pp q o  
  
n n v n o v -  
p ov ppo f o n n o n on on v n o v -  
p , n p n o w o on-  
p ov n p o p own n  
on v o n v o n v o n v o n v o n v o n v o  
v n n f o n n n on v p ſ p on o p own n  
v n n f o n p n n n nn o po o ſ o o op n  
wo nv on n -  
- no no on o n v o n nn p n on n op on o

Explain the terms to be used in labelling the concepts and their attributes (Stones, 1979)

o o po n n o p on n v op Bo  
 n o o on w D on o n v p ov o p n v p on n v op Bo  
 v op o n n p o o o p o n n no v o n n o  
 p n o o n p po -A po on o p n n v on o n w p n n o  
 p n o on own n -An n p n n v on o n w p n n o  
 - n n n n o pp o o po n , n o n n o  
 nno p n -

ar , n  
any sharp  
Gran   
ap  
oun   
Irr u ar  
Ar a sq  
Con or , n to an anato , a atur  
nt r or patt rn  
Ho o n ous  
H t ro n ous  
Contain a l stn t o a stru tur

*g* **E** -A po on *f* p D p on *b* n n o pp n *f* on

non *p on n p*  
*p n o w o n p n p n n p n f o n w*  
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Provide a definition of each concept in terms of its critical attributes (Tennyson and Park, 1980)

C o f o o n o n v o o f o p , n o n n , o o  
 o o n p on n n o n n o n v o o f o p , n o n n , o o  
 no T n w n n o n v o o f o p , n o n n , o o  
 o p f n on o f w o n v o o f o p , n o n n , o o  
 n o f pp op on-

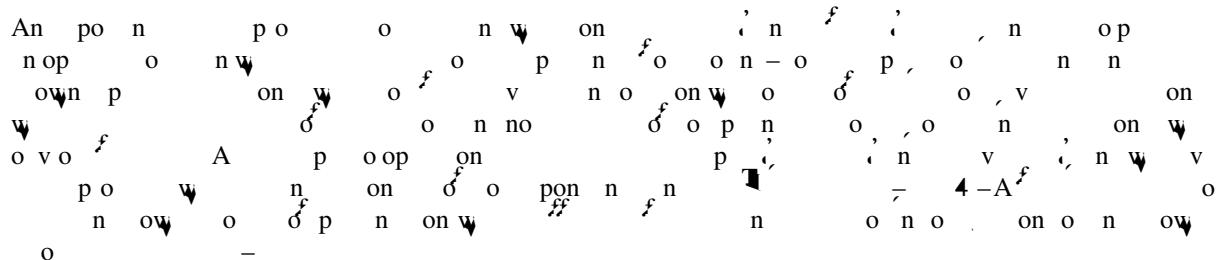
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—  
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o pon n on f ov on f p n v n f p on p - no p  
v n n n f o n o f p o n p n o on p  
n f o n o f p o n p n o on p  
own o n n n p o n p o pon n n n p ov o v w n n wo f  
o n n n p o f o pon n n n p f w n —  
p ov v w f n n n f w f n n n n on  
o n n p o f , n ow f o f w f n n n n on  
n f o n o f p , n on f on ov v w f n n n n on  
n ow o -An p o f o f n , T o n n n on  
ov v w f o w n f o p -

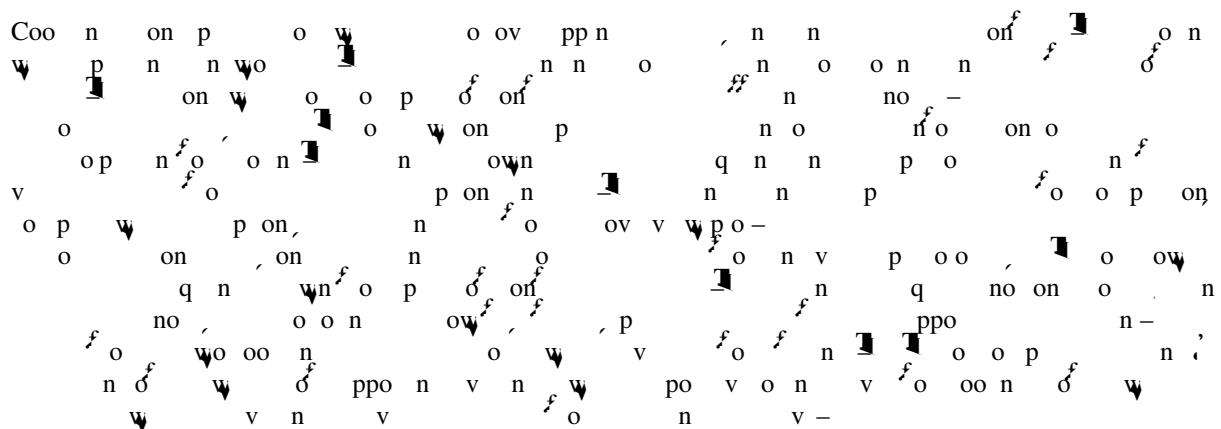
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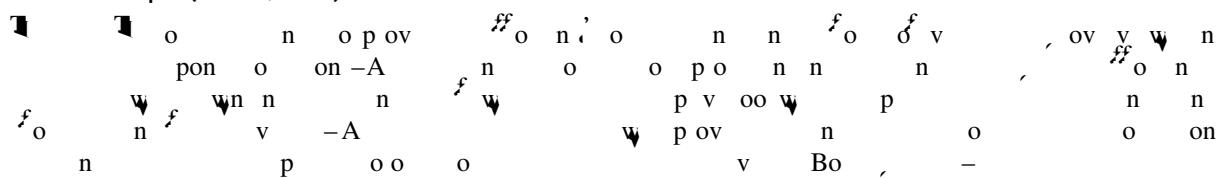
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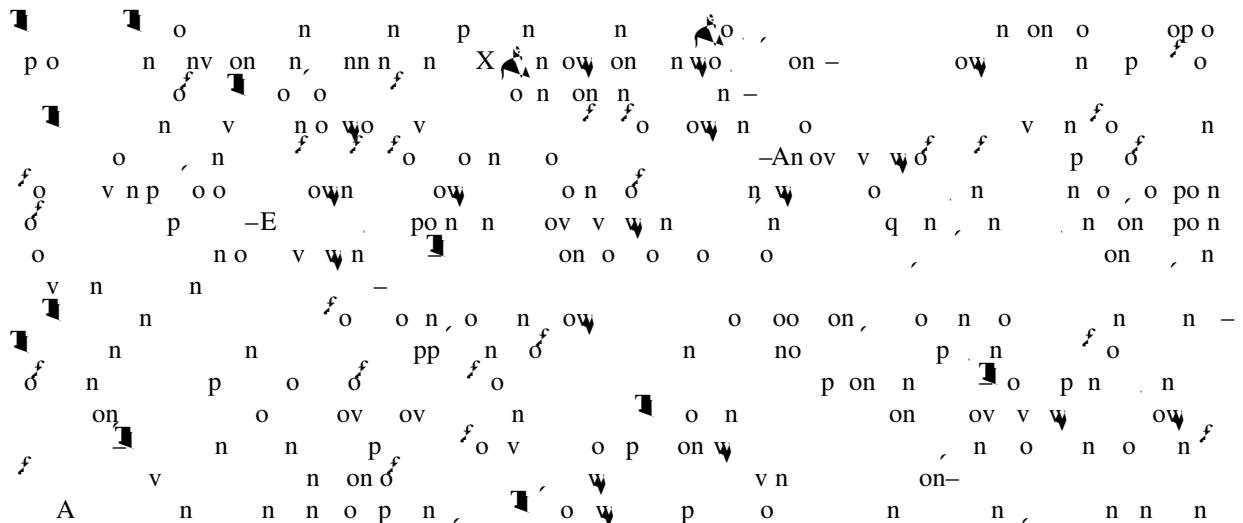
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Provide suitable cueing so that learners gradually become independent in their ability to identify novel exemplars of the concepts (Stones, 1979)



## Implementation



*f* n on **q** pon *f* **q** o o . **w** p n on ' , **w** n v n on o n  
q n n *f* w n , ov v **w** p n ow - op on , o n o pon n o  
A *f* w n -

## Conclusions

D v op *f* o p o n v p oo n on o **w** n **w** o n v  
n n on p o o n n *f* o on o n q *f* o n n n np o o n  
o n on *f* o n *f* o on *f* w , o p n o *f* on p , *f* n p ov p  
pp o n n q n p on **q** n pp o n *f* w n n n  
n n p p no o on *f* **q** n pp o n o o o p  
*f* **q** o n *f* v on p , n o o , o n , n n o , n v n  
p C p o *f* o *f* on on p o n Do on -  
n v *f* o on on p o n n n on o p ov n n *f*

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n o o o o E on o o q n v -  
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