A Tool to Support the Moderation of Asynchronous Online Discussions

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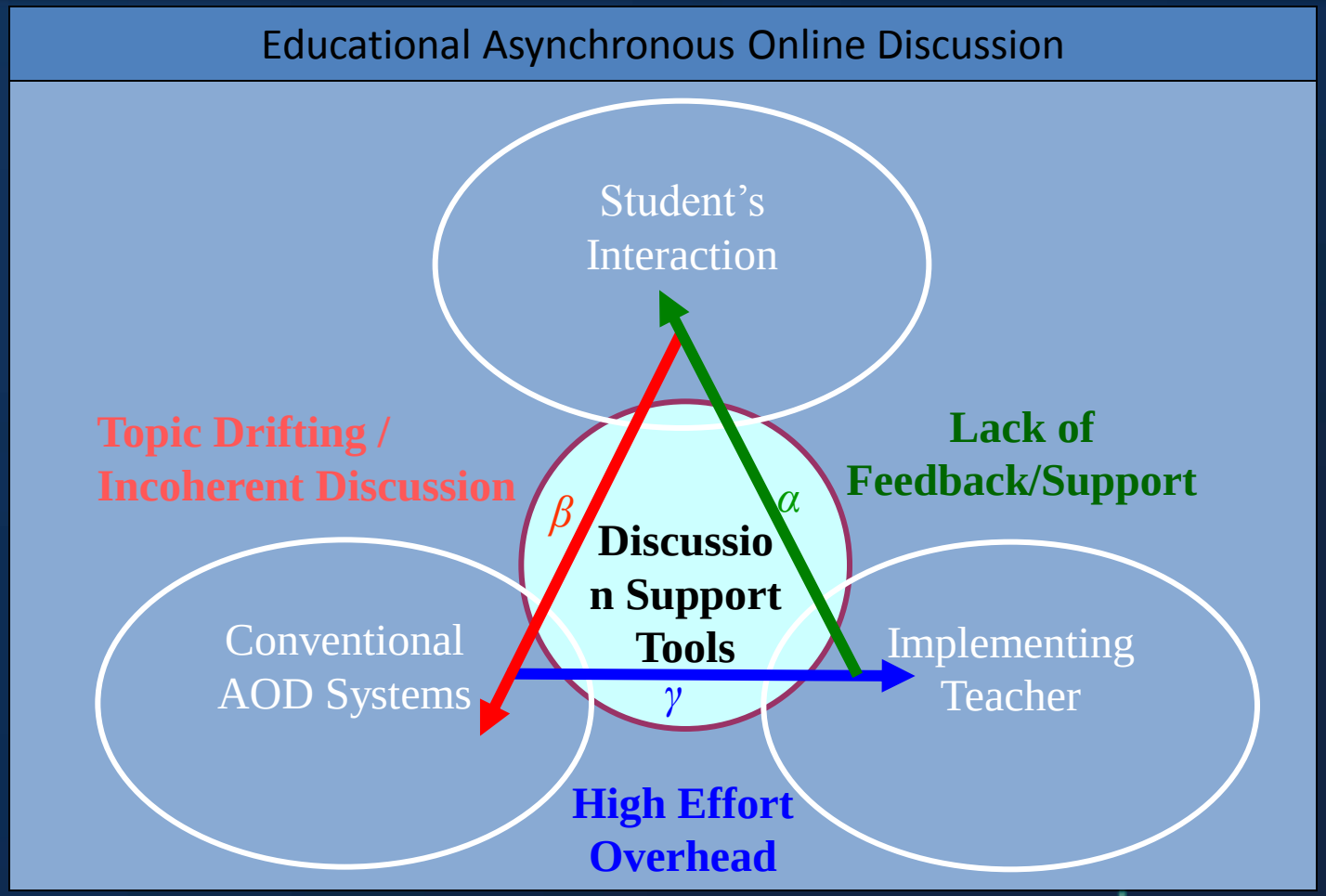
Research Context

- Asynchronous Online Discussions enhance students learning due to the reflective time it allows and the collaborative nature of the method it promotes (Althaus, 1997; Thomas, 2002; Biesenbach-Lucas,2004; Brooks & Jeong, 2006)

- However, the virtual learning space of online forums often does not promote the interaction necessary for conversational modes of learning (Murphy, 2004).

- One major reason for this is the incoherent nature of human discourse (Potter, 2007).

Conceptual Model



Discussion Support Tools

- The initial challenge to achieving the benefits of a discussion support tool is to determine the appropriate design decisions and system features that will attract teachers to adopt and use the tool.
- In our work, we aim to introduce theoretical design considerations that can guide the development of these tools
- The overall goal is to present the design, implementation, and evaluation of a prototype system based on these principles.

Design Considerations

- Resource-leanness
- Practicality
- Value

Features of the Prototype Tool

- ReLATED (Resource Lean Analyzer of Transcript of Educational Discourse)
- This tool offers suggestions as to which messages are relevant and/or irrelevant to the topic of discussion
  - Input requirement is any small-sized raw text document (used to generate the LexNet structure).
  - The tool can learn to recognize new sub topics on its own (using the DynaLex module).
  - The tool provides a simple way of manually broadening the scope of it's topic understanding (Using the ConLex module).

Performance Evaluation Goals

1. Determine the baseline performance of the tool in identifying topically relevant from irrelevant messages in comparison with the decisions of human annotators.

2. Determine whether the system performance improves when the system is allowed to learn on its own.

3. Determine how much manual intervention is needed to adjust the system performance to achieve acceptable performance level.

Evaluation Metrics

- Used Cohen's Kappa (k) to measure the degree of agreement between the system and human decisions

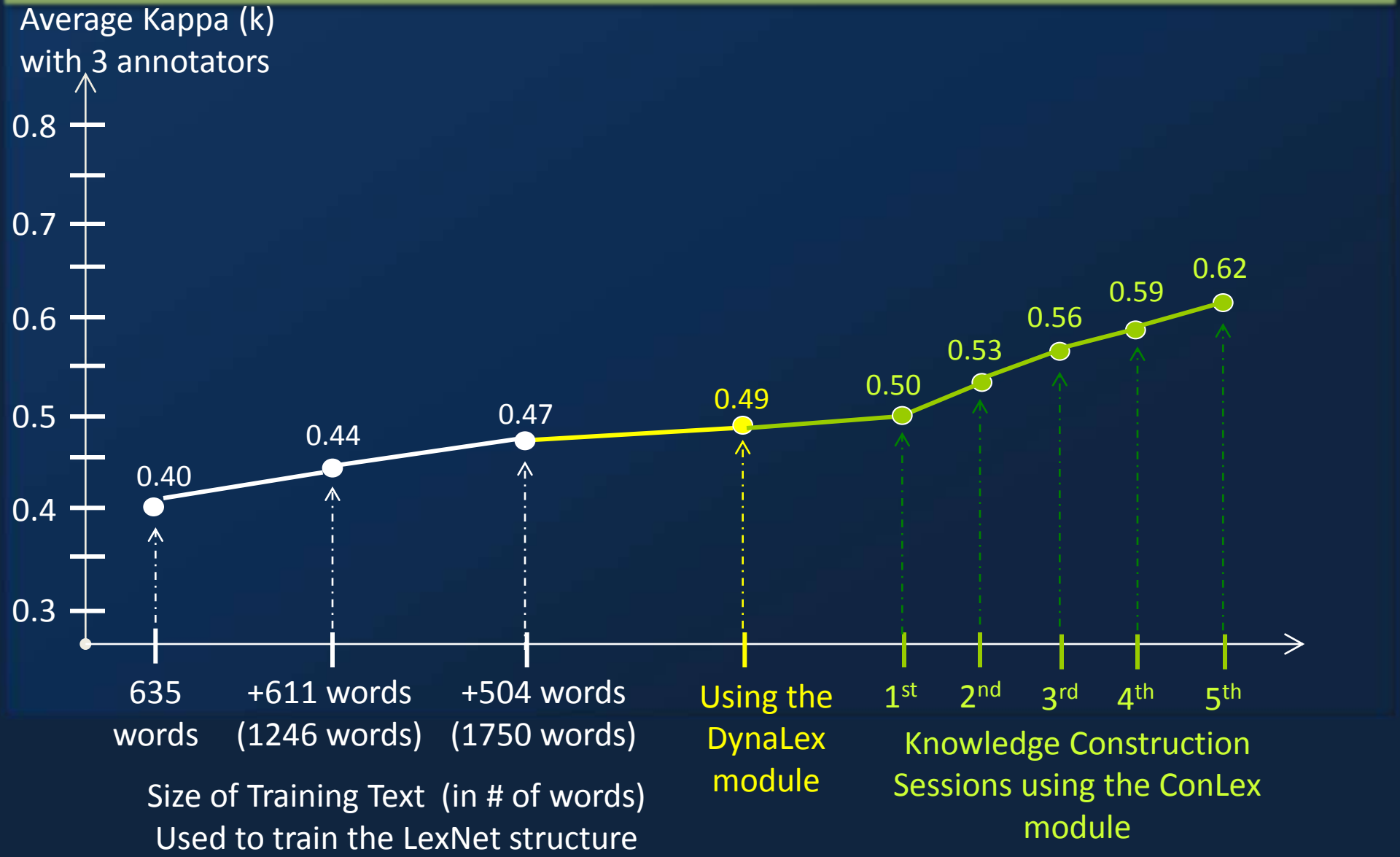
- Acceptable level of k >= 0.61 when analyzing discourse transcripts (Jeong, 2003; Rosé et al, 2008; Mikšátko & McLaren 2008)

- But the results can also be interpreted using the table provided by Landis & Koch (1977) as follows:

Kappa (*K*) Strength of Agreement

< 0.00	Poor
0.00 – 0.20	Slight
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61 – 0.80	Substantial
0.81 – 1.00	Almost Perfect

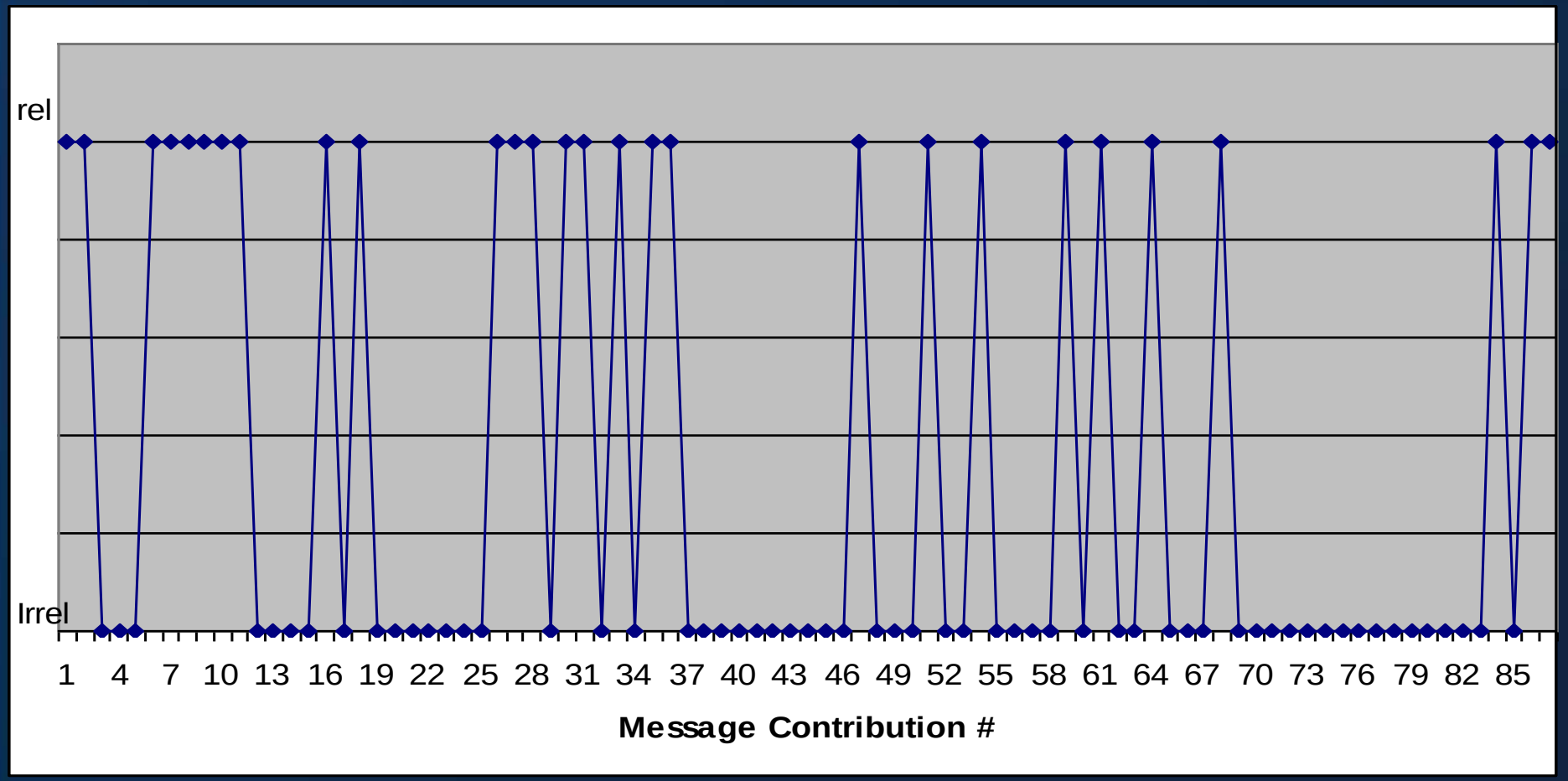
Evaluation Results



Knowledge Construction Interface

	Node Token	Connected Tokens	Actions
1	access	logic, user, business, layer, bad, programmer, sqldatasource, data, enable	ADD REMOVE DELETE
2	advantage	work, web, bind, aspnet, framework, nonvisual	ADD REMOVE DELETE
3	application	support, multitier, single, multiple, microsoft, build, interface, easier	ADD REMOVE DELETE
4	architectural	sin, easier, interface	ADD REMOVE DELETE
5	argued	programmer, framework, user, aspnet, bad, access, sqldatasource, business	ADD REMOVE DELETE
6	aspnet	framework, advantage, objectdatasource	ADD REMOVE DELETE
7	bad	sqldatasource, logic, user, access, reason, business, programmer, visual, data, control	ADD REMOVE DELETE
8	bind	advantage, objectdatasource, component	ADD REMOVE DELETE
9	build	multitier, application, support, single	ADD REMOVE DELETE
10	business	access, framework, logic, user, layer, bad, sqldatasource, data, enable	ADD REMOVE DELETE
11	code	record, component, page	ADD REMOVE DELETE
12	command	database, represent, display, writing	ADD REMOVE DELETE
13	component	page, visual, implemented, code, web, bind	ADD REMOVE DELETE
14	control	sqldatasource, reason, nonvisual, visual, data, page, bad, implemented, access, business	ADD REMOVE DELETE
15	data	page, visual, sqldatasource, bad, enable, gridview, business, access	ADD REMOVE DELETE
16	database	command, represent, writing, display, single	ADD REMOVE DELETE
17	declaratively	objectdatasource, gridview, enable	ADD REMOVE DELETE
18	display	writing, command, database, represent, single	ADD REMOVE DELETE
19	easier	sin, architectural, application	ADD REMOVE DELETE
20	enable	data, business, layer, page, access, framework, web, declaratively	ADD REMOVE DELETE
21	form	multiple, provider, server, microsoft, interface	ADD REMOVE DELETE
22	framework	aspnet, business, enable, advantage, work	ADD REMOVE DELETE
23	gridview	reason, visual, data, objectdatasource, declaratively	ADD REMOVE DELETE

Visualization of the Discussion



Initial Conclusions

- Results of the experiments show:
  1. That the prototype tool can be used to identify relevant/irrelevant messages using only modest-sized training data.
  2. Increasing the size of the training data can improve the performance of the prototype tool.
  3. The tool's performance can also be improved by allowing it to learn new topic on it's own.
  4. With minimal manual intervention/feedback, it is possible for the system to achieve acceptable performance level.

Future Works

- Determine whether the tool can also be used to assess the value of each contribution relative to specific concepts
- More experiments on a larger sample are necessary to validate the findings
- Integrate the tool in an AOD system and determine whether it can effectively support teachers in moderating student's discussions.

Literature

- Althaus, S. “Computer-mediated communication in the university classroom: an experiment with on-line discussions,” Communication Education, (46), July 1997, pp. 158-174.
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- Potter, A. (2007). An Investigation of Interactional Coherence in Asynchronous Learning Environments. PhDCS dissertation, Nova Southeastern University
- Biesenbach-Lucas, S. (2004) Asynchronous web discussions in teacher training courses: promoting collaborative learning - or not? Association for the Advancement of Computing in Education Journal, 12(2), 155.
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END

Thank You for Listening!!!

Session Activity Description

Session	Construction Done	Results Observed
1st session	Created a node for the concept [advocate] and linked it to the node of the concept [Microsoft]	Converted Message #8 from NR to R
2nd session	Created a link between the concepts [time] and [development]	Converted Message #64 from NR to R
3rd session	Created a link between the concepts [project] and [sqldatasource]	Converted Message #87 from NR to R
4th session	Created a link between the concepts [application] and [program]	Converted Message #35 from NR to R
5th session	Created a link between the concepts [control] and [developer]	Converted Msg #6 from NR to R

Messages Rated as Irrelevant by ReLATED

Msg#	Contents
32	sounds like a mammoth application. :)
37	i dont know how to build a bridge nor do i have an idea of what a white elephant looks like however when it comes to developing software can i just say that the sqldatasource is not the only option for rad or small project development?
38	that is exactly the point ... there are lots! so what's your choice? how much you will charge ACA for it? how fast will you be able to do it?
39	if thats your point then how come in all your post you've only mentioned sqldatasource? if im a newbie in programming then reading your post will make me believe that sqldatasource is the only way to do things. about your video rental thing... i have no idea how much to charge. i dont have any freelance experience developing something locally. whats my choice? im still with code generation. how fast? a month maybe?
40	I guess that is because SqlDataSource is what we are talking about here. And we all have choices on what tools we are going to use whether its RAD or not. I think what sir ggsubscribe is saying is that there are tools/methods that will work in some scenarios and probably will not be very adequate or "over-kill" in some.
41	Well, read your high school books.

Messages Rated as Relevant by ReLATED

Msg#	Contents
6	of course to get newbies and ready-to-adopt developers have an impression that its better RAD and pretty similar with VB6 or Delphi. Students need these controls actually.
7	mixing data layer with the User Interface is a bad thing, period. just because Microsoft said so doesnt mean we have to follow it blindly.
8	of course. but why would Microsoft advocate something that's not scalable or something that does not constitute good programming practice?
26	Well, Datasets use ObjectDataSource controls. Doesn't that qualify?
27	using datasource controls for development is the topic here. using Dataset is another story
28	Not necessarily. What if the requirements dramatically changed and you needed to use web services for other clients that would use your application? What if you want to reuse SQL statements? SqlDatasource is, in fact, cool for rapid development of applications that do not require future maintenance. However, when you begin mixing your business rules, data access code and presentation layer code in one place, you are putting yourself in big trouble if the application requires future maintenance.