Evaluation

1 – Customer Requirements

In this section I will evaluate whether or not each of the objectives set in the specification has been fulfilled by my system to determine whether or not the system has met the customer requirements. If the system has not met a particular objective, I will endeavour to explain why this is the case. If the system has met an objective, evidence will be provided to certify that the system has achieved what was expected of it..

1.1 – General Objectives

1.1.1 – Interface

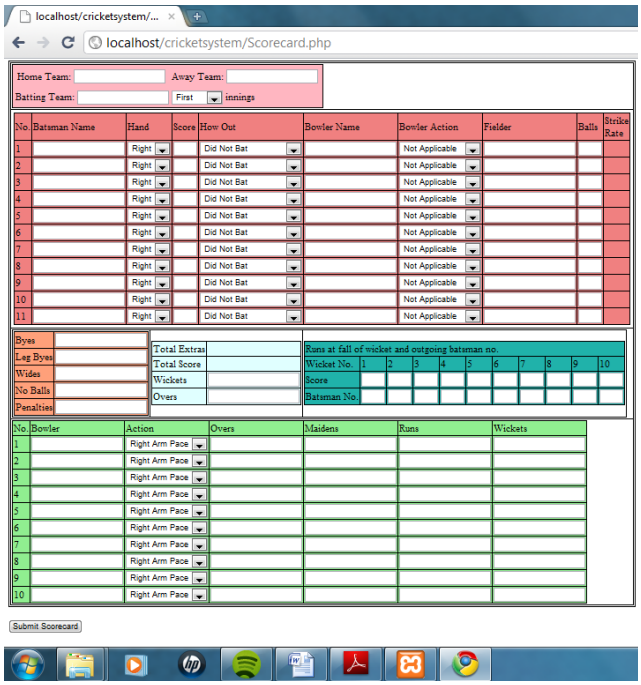
Objective:

Easy to use interface so that inexperienced computer users can manage with little training.

Fulfilled?:

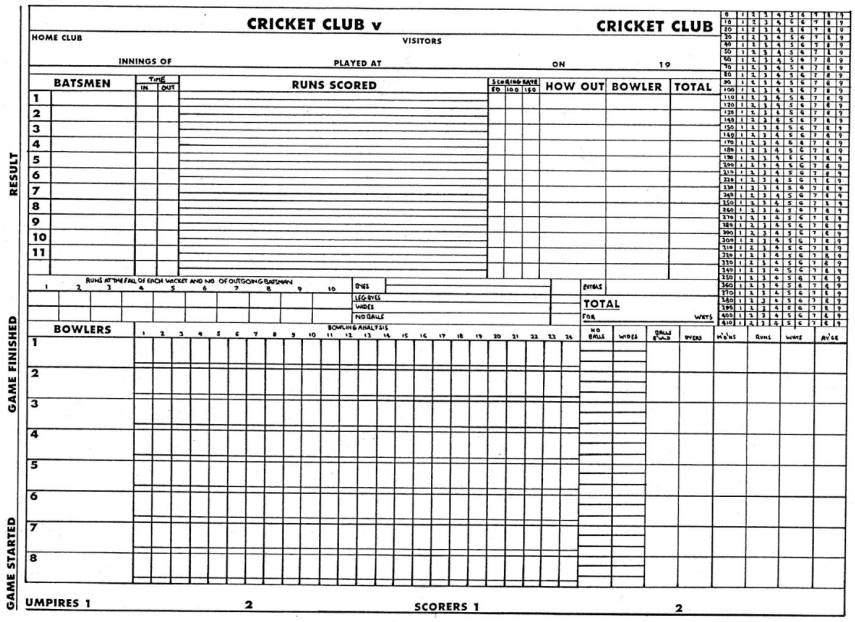
This objective has been fulfilled. I have achieved this by using as far as possible through two methods. Firstly, I have endeavoured to design the interface of my system to as closely as possible mirror those found on web forms which for the most part even relatively inexperienced users are comfortable with as they are commonly used on the internet. Secondly, I have designed the scorecard sections of my system so that they mirror as closely as possible the previous scorecard system as based traditionally on paper.

Evidence:



I have used text fields, drop down menus and a submit button like the majority of web based form s commonly found on the internet.

This scorecard is similarly formatted to the traditional paper scorecard shown underneath.


CRICKET CLUB v CRICKET CLUB

HOME CLUB VISITORS

INNINGS OF PLAYED AT ON 19

BATSMEN | TIME IN | TIME OUT | RUNS SCORED | SCORING RATE ED | 100 | 150 | HOW OUT | BOWLER | TOTAL

1 2 3 4 5 6 7 8 9 10 11

RESULT

GAME FINISHED

GAME STARTED

BOWLERS

1 2 3 4 5 6 7 8

BYES LEG BYES WIDES NO BALLS EXTRAS TOTAL FOR WKTS

UMPIRES 1 2 SCORERS 1 2

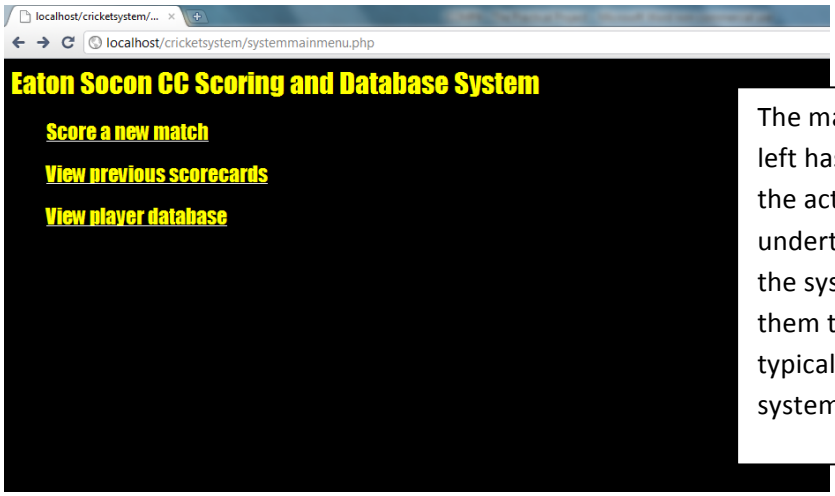
See also section 7.1, questionnaire question 1, in which the client stated that the system was generally "quite simple" to navigate around and that they had "no problem" using the scorecard sections because they looked similar to the paper scorecard. This suggests that the client is satisfied that the objective has been achieved by the system.

1.1.2 – Menu Structure

Objective: Straightforward menu structure with useful and informative prompts.

Fulfilled: This objective has been fulfilled to an extent. The majority of the menus in my system operate using hyperlinks as used commonly on the internet so they will hopefully be familiar to most users. Rather than setting up interactive prompts, I have attempted to name the hyperlinks as clearly as possible to allow the user to navigate the system effectively.

Evidence:



The main menu page shown on the left has hyperlinks which describe the activities the user may want to undertake and link to the area of the system where it is possible for them to achieve their task. This is typical of the menu pages of my system

See also section 7.1, questionnaire question 2, in which the customer commented that "the menu structure works well and most of the links and buttons are self explanatory and helpfully labelled". This suggests that the customer is satisfied that the objectively has been met by the system.

1.1.3 – Eliminating Human Error

Objective: Reduce human error as much as possible by having most processes undertaken by computer.

Fulfilled: This objective has been partially fulfilled. Although the more complex mathematical calculations are undertaken by the computer, the user is still required to calculate the more straightforward details regarding players' batting scores and bowling figures, which still need to be recorded prior to data entry on the system using the traditional method on paper, for reasons which will be explained later. Therefore, although the chance of human error compiled to compiling the statistics by hand has been reduced, it has not been reduced as far as would be ideal.

Evidence:

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	P.Orton	R	33	Caught	G.Daniels	RPace	B.Nicklin	41	80.5
2	G.Vincent	R	12	Bowled	D.Marchant	LPace		20	60
3	A.Samson	L	56	Caught	J.Donnelly	RPace	D.Humphrey	69	81.2
4	D.Wright	R	0	LBW	G.Daniels	RPace		1	0
5	H.Gangman	R	2	Bowled	G.Daniels	RPace		4	50
6	K.Preston	R	1	LBW	J.Donnelly	RPace		4	25
7	S.Spindlay	R	10	Caught	C.Baker	RSpin	R.Brown	17	58.8
8	M.Iqbal	R	28	Stumped	C.Baker	RSpin	D.Humphrey	44	63.6
9	L.Freer	R	9	Caught	D.Marchant	LPace	C.Baker	10	90
10	F.Kidman	R	4	Caught	R.Alevoor	RPace	C.West	3	133.3
11	T.Uppington	R	1	Not Out		NA		1	100

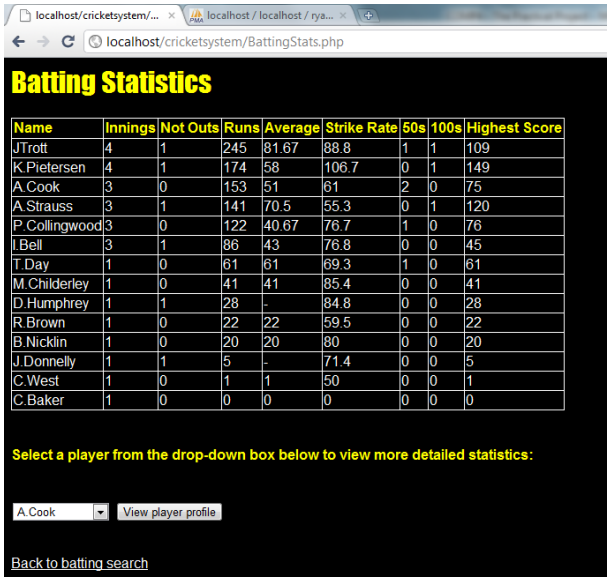
Byes	7
Leg Byes	1
Wides	0
No Balls	4
Penalties	0

Total Extras	12
Total Score	168
Wickets	10
Overs	43

Runs at fall of wicket and outgoing batsman no.										
Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	25	71	71	75	76	89	110	122	135	146
Batsman No.	2	1	4	5	6	7	3	9	11	8

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	G.Daniels	RPace	8	0	36	3	12	4.5	16
2	D.Marchant	LPace	9	3	21	2	10.5	2.33	27
3	R.Alevoor	RPace	7	0	31	1	31	4.43	42
4	J.Donnelly	RPace	6	1	21	2	10.5	3.5	18
5	C.Baker	RSpin	6.4	1	19	2	9.5	2.85	20
6	M.Childerley	RSpin	7	0	28	0	-	4	-

The batting strike rate, and the bowling average, bowling economy and bowling strike rate values are all calculated automatically by the system when viewing previous match scorecards.



Name	Innings	Not Outs	Runs	Average	Strike Rate	50s	100s	Highest Score
JTrott	4	1	245	81.67	88.8	1	1	109
K.Pietersen	4	1	174	58	106.7	0	1	149
A.Cook	3	0	153	51	61	2	0	75
A.Strauss	3	1	141	70.5	55.3	0	1	120
P.Collingwood	3	0	122	40.67	76.7	1	0	76
I.Bell	3	1	86	43	76.8	0	0	45
T.Day	1	0	61	61	69.3	1	0	61
M.Childerley	1	0	41	41	85.4	0	0	41
D.Humphrey	1	1	28	-	84.8	0	0	28
R.Brown	1	0	22	22	59.5	0	0	22
B.Nicklin	1	0	20	20	80	0	0	20
J.Donnelly	1	1	5	-	71.4	0	0	5
C.West	1	0	1	1	50	0	0	1
C.Baker	1	0	0	0	0	0	0	0

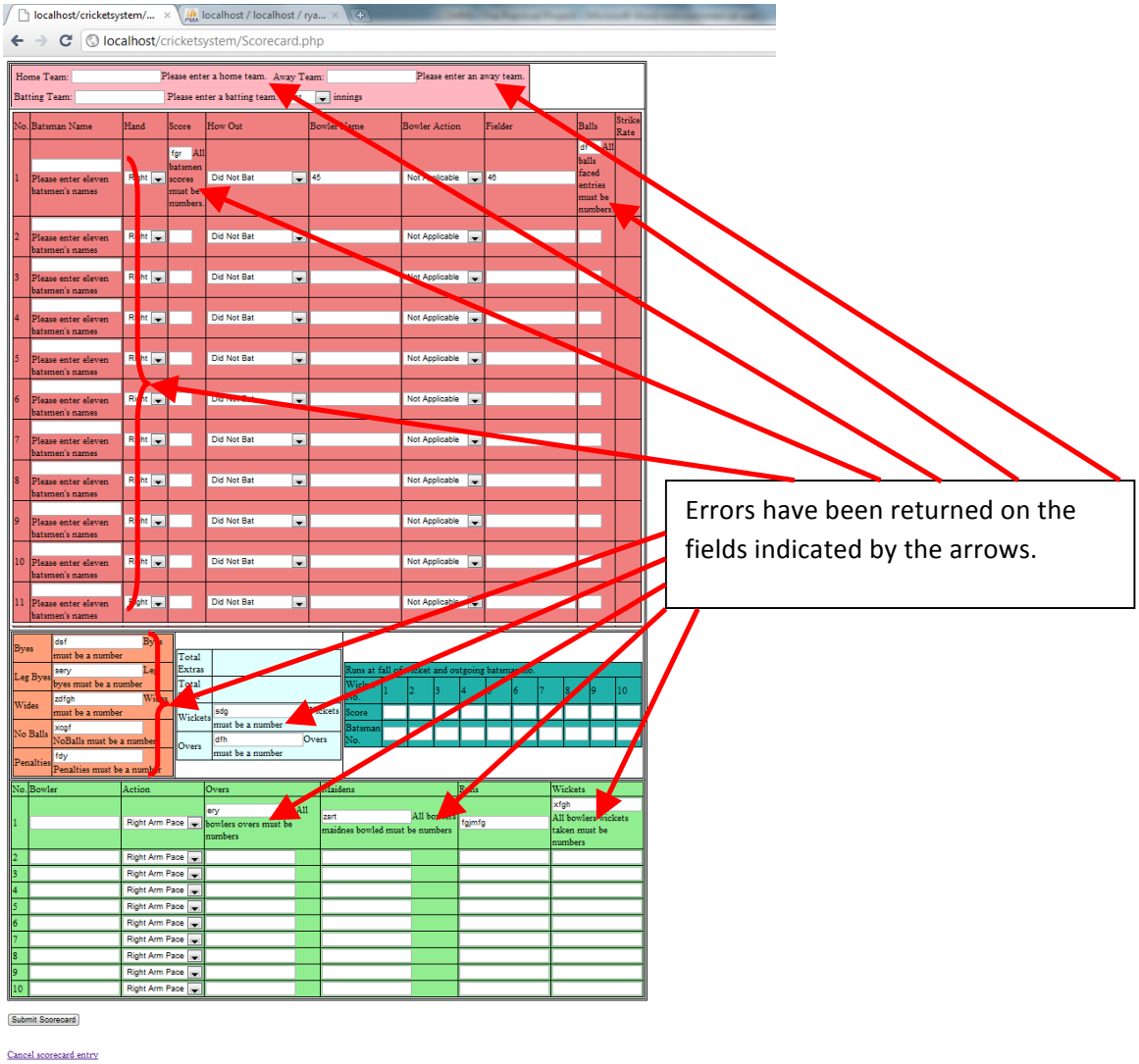
All of the statistics on this page are calculated automatically by the system.

1.1.4 – Validation

Objective: Sufficient validation to prevent as many mistakes as possible.

Fulfilled: This objective has to an extent been fulfilled. There is validation in place now (not present in previous sections and therefore not tested thoroughly) to prevent the user from entering the wrong type of data into the scorecard form. There are, however, no range checks on any of the fields and so the objective has not been completely met.

Evidence:



See also section 7.1, questionnaire question 4, in which the customer commented that "It's helpful in preventing me from forgetting to fill out parts of the form, but to be really useful it needs to provide suggestions from the database when filling in names to prevent me from storing a different player due to making a typo when entering the name. Also needs something to stop me putting huge numbers in by accident". Therefore, the customer believes that the objective of preventing errors when entering match data through validation has only been met partially because of the lack of range checks on numerical fields and the possibility of failing to register a player's performance properly because the name entered by the user may not match that stored on the database.

1.1.5 – Fast Response

Objective: System must be fast to use so that data can be recorded between balls.

Fulfilled: This objective has been made redundant by adaptations made to my system during the implementation phase. Ball-by-ball match processing is in fact no longer undertaken by the system due to the difficulties of processing real time events using web based applications and the limited time available to implement the system due to the restrictions of the course. See also section 7.1, questionnaire question 5.

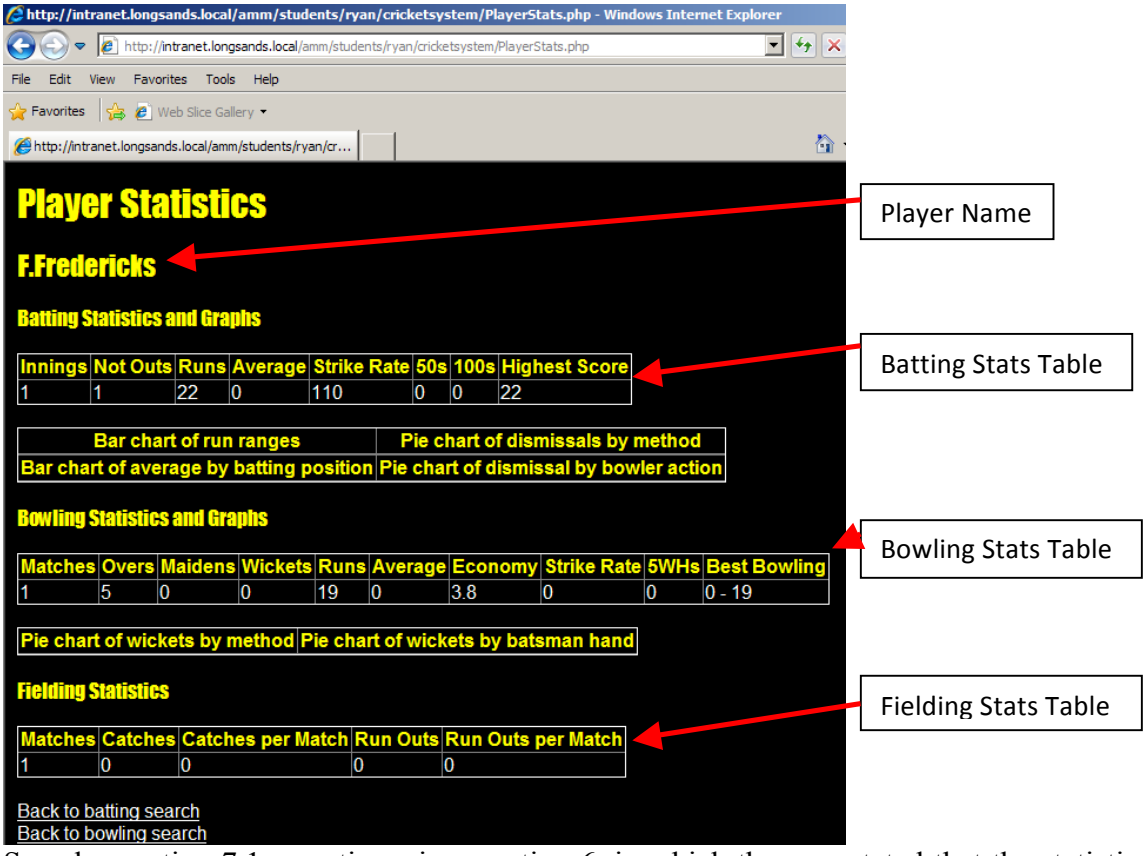
1.2 – Specific Objectives

1.2.1 – Player Statistics Pages Present

Objective: User should be able to view a well set out page of statistics for each player on record.

Fulfilled: It is possible to view a page showing each individual player's batting, bowling and fielding statistics in separate tables.

Evidence:



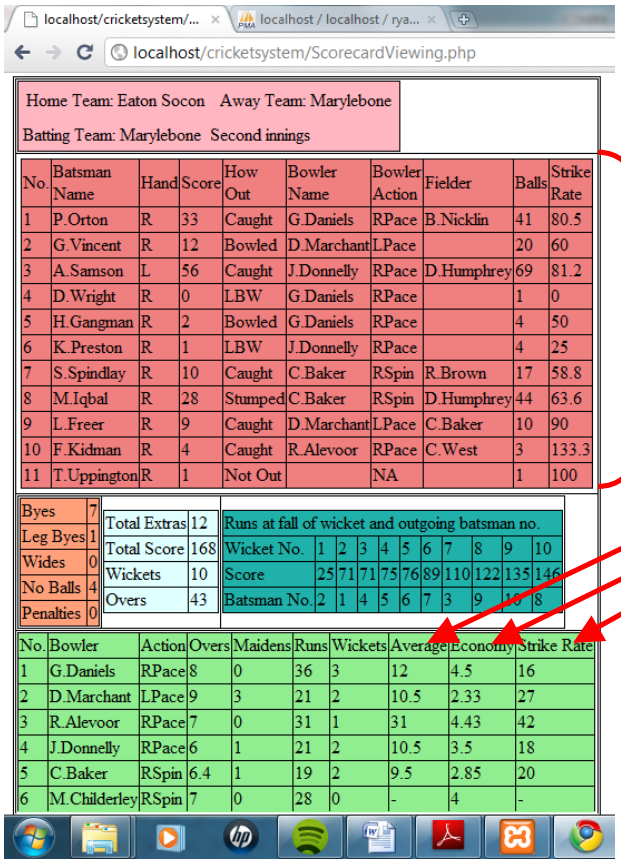
See also section 7.1, questionnaire question 6, in which the user stated that the statistics and layout of the player pages are "ideal" except for the lack of graphs, but the graphs are not covered under the remit of this objective. Therefore the client is clearly satisfied that this objective has been met by the system.

1.2.2 – Scorecard Layout

Objective: Score sheet should be simple and clear but informative.

Fulfilled: This objective has been fulfilled. The scorecard has been designed in a clear and simple manner (by cricket standards) by remaining as close as possible to the traditional layout on paper in order to allow it to be used easily by those with a knowledge of cricket. The scorecard also contains a wealth of information which is not found on the traditional scorecard such as strike rates, economy rates and bowling averages.

Evidence:



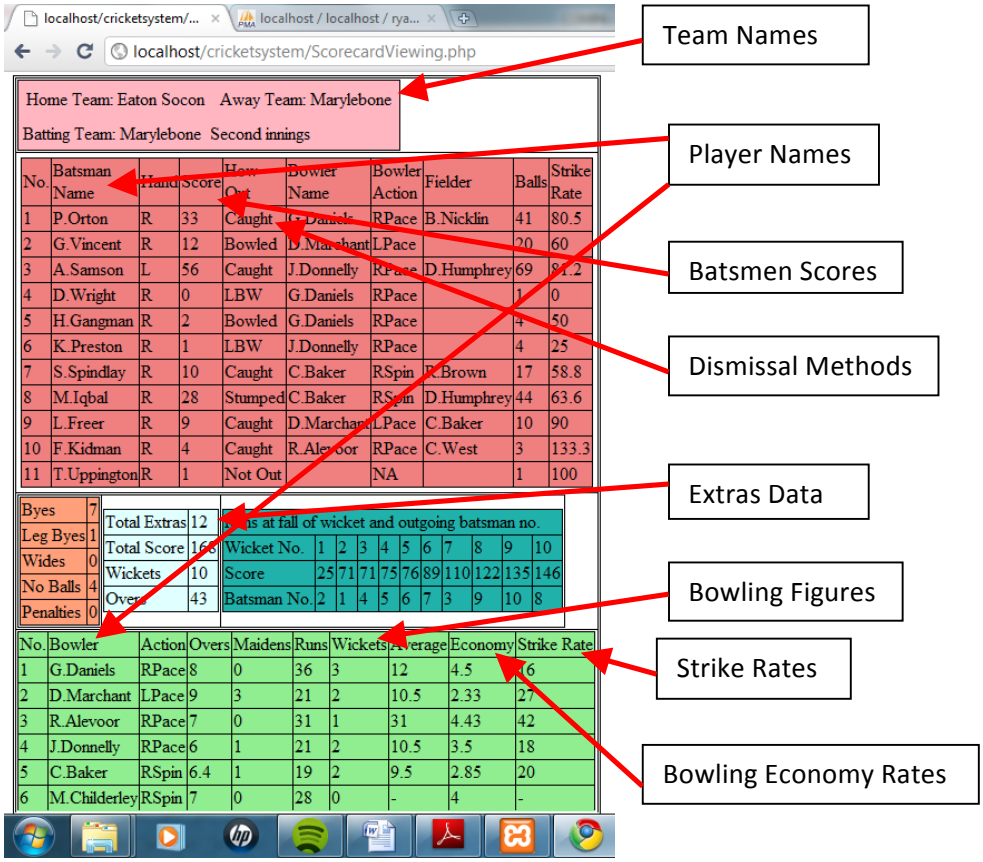
See also section 7.1, questionnaire question 7 in which the user commented that the scorecard is "more informative than the paper scoresheets I'm using at the moment. Similar to them in its layout as well, so it's ideal". This response shows that the client is satisfied that the system has met this particular objective.

1.2.3 – Relevant Innings Data Present

Objective: Score sheet should contain details of: player names; team names; batsmen's scores; dismissal methods; bowler's figures; extras conceded; run rates; strike rates; economy rates.

Fulfilled: All of the data stipulated in the objective is contained in the scorecard, except from the innings run rate.

Evidence:



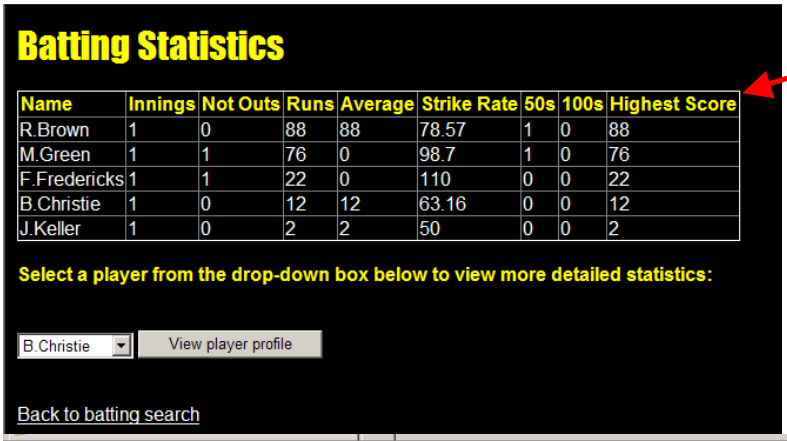
See also section 7.1, questionnaire question 8, in which the customer recognises the absence of the run rate data they required and therefore responded that the system had only partially fulfilled this objective.

1.2.4 – Player Database Stats Pages Contain Relevant Data

Objective: Player records should store details of games played, total runs, total innings, not outs, batting average, 50's, 100's, strike rate, ducks, run ranges, dismissal methods, overs bowled, wickets taken, runs conceded, maidens bowled, bowling average, five wicket hauls, economy rate, best bowling, strike rate, catches taken and run-outs effected.

Fulfilled: There is a separate page through which the user can access the batting, bowling and fielding statistics of every player on the system. All of the statistics stipulated in the objective are calculated and displayed by the system except for the number of ducks (scores of 0) scored by each batsman and the run ranges of each batsman.

Evidence:



Batting Statistics

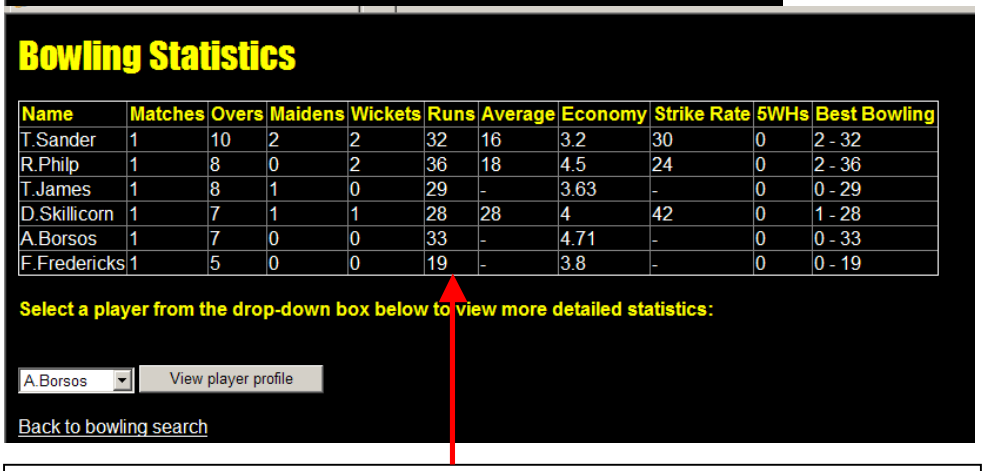
Name	Innings	Not Outs	Runs	Average	Strike Rate	50s	100s	Highest Score
R.Brown	1	0	88	88	78.57	1	0	88
M.Green	1	1	76	0	98.7	1	0	76
F.Fredericks	1	1	22	0	110	0	0	22
B.Christie	1	0	12	12	63.16	0	0	12
J.Keller	1	0	2	2	50	0	0	2

Select a player from the drop-down box below to view more detailed statistics:

B.Christie | View player profile

Back to batting search

This table contains innings, not outs, runs, batting average, batting strike rate, fifties, hundreds and highest scores.



Bowling Statistics

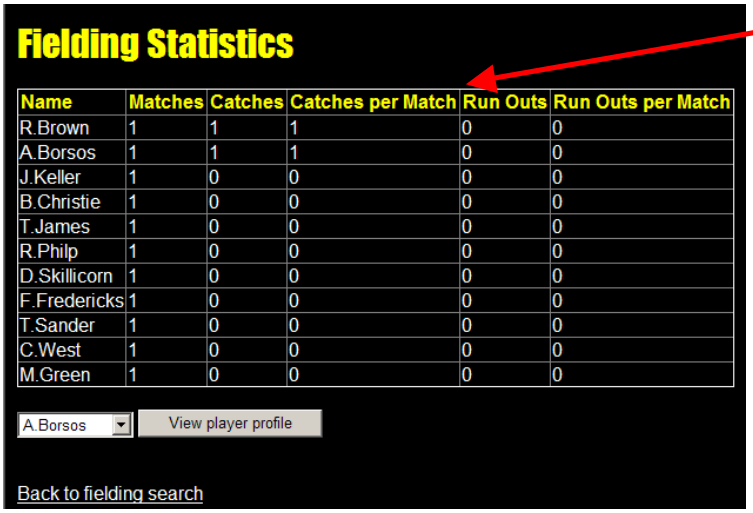
Name	Matches	Overs	Maidens	Wickets	Runs	Average	Economy	Strike Rate	5WHs	Best Bowling
T.Sander	1	10	2	2	32	16	3.2	30	0	2 - 32
R.Philp	1	8	0	2	36	18	4.5	24	0	2 - 36
T.James	1	8	1	0	29	-	3.63	-	0	0 - 29
D.Skillicorn	1	7	1	1	28	28	4	42	0	1 - 28
A.Borsos	1	7	0	0	33	-	4.71	-	0	0 - 33
F.Fredericks	1	5	0	0	19	-	3.8	-	0	0 - 19

Select a player from the drop-down box below to view more detailed statistics:

A.Borsos | View player profile

Back to bowling search

This table contains data on the number of matches played by each player, the number of overs bowled, maidens bowled, wickets taken, runs conceded, bowling averages, bowling economy rates, bowling strike rates, five wicket hauls and best bowling figures.



Fielding Statistics

Name	Matches	Catches	Catches per Match	Run Outs	Run Outs per Match
R.Brown	1	1	1	0	0
A.Borsos	1	1	1	0	0
J.Keller	1	0	0	0	0
B.Christie	1	0	0	0	0
T.James	1	0	0	0	0
R.Philp	1	0	0	0	0
D.Skillicorn	1	0	0	0	0
F.Fredericks	1	0	0	0	0
T.Sander	1	0	0	0	0
C.West	1	0	0	0	0
M.Green	1	0	0	0	0

A.Borsos | View player profile

Back to fielding search

This table contains data on the number of matches played by each player, the number of catches taken by each player and run outs affected by each player.

See also section 7.1, questionnaire question 9, in which the user recognises the omission of data regarding ducks and run ranges of each player and for these reasons states that this objective has only been partially fulfilled.

1.2.5 – Fast and Simple Data Input

Objective: User should be able to record the result of each ball with one key press and a confirmation key press; except for in exceptional circumstances e.g. wickets, extras.

Fulfilled: This objective has been largely made redundant by the move away from ball-by-ball match processing. However, data input is probably not as fast as would be ideal using the alternative system because there is some data duplication on the scorecard and many fields to enter data to.
See also section 7.1, questionnaire question 10

1.2.6 – Complex Data Calculated by System

Objective: System should process data to calculate run rates, economy rates and strike rates.

Fulfilled: This objective has been partly fulfilled. Strike rates and economy rates have been calculated and displayed on a range of pages, including the batting, bowling and fielding stats pages, the individual player pages and the previous scorecard review feature.

Evidence: See evidence for objectives 1.2.1, 1.2.3 and 1.2.4. Also see section 7.1, questionnaire question 11, to which the user replied that the objectively had been completely fulfilled.

1.3 – Core Objectives

1.3.1 – Scoring a Match

Objective: System must be able to keep score of matches using input from a scorer.

Fulfilled: This objective has not been fulfilled. Instead the system now receives iput of a completed match from the user after it has been scored using the traditional method on paper.

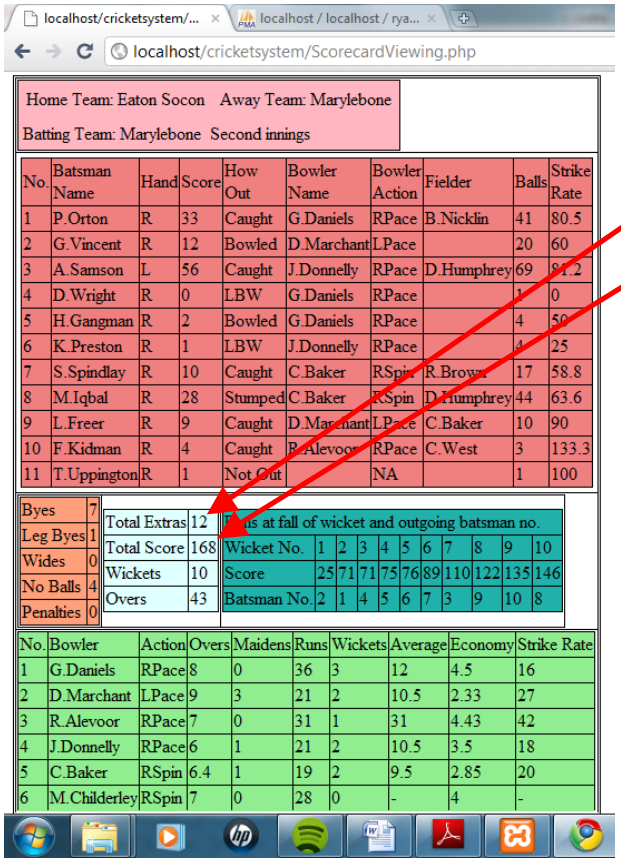
See also section 7.1, questionnaire question 12

1.3.2 – Calculating Scores

Objective: System must calculate player scores, extras and total team scores.

Fulfilled: This objective has been partially fulfilled. The player's individual scores are input by the user, but the total number of extras and the total team score is calculated by the system.

Evidence:



See also section 7.1, questionnaire question 13, in which the user notes the accurate calculation of the total team score and the number of extras but states that the objective has only been partially fulfilled because the system does not calculate each player's score because of the switch away from ball by ball match processing.

1.3.3 – Calculating Bowling Figures

Objective: System must calculate bowling figures.

Fulfilled: This objective has not been fulfilled. Each bowler's figures are instead input by the user.
See also section 7.1, questionnaire question 14

1.3.4 – Scoresheet Storage

Objective: System must be able to store a minimum of 60 score sheets.

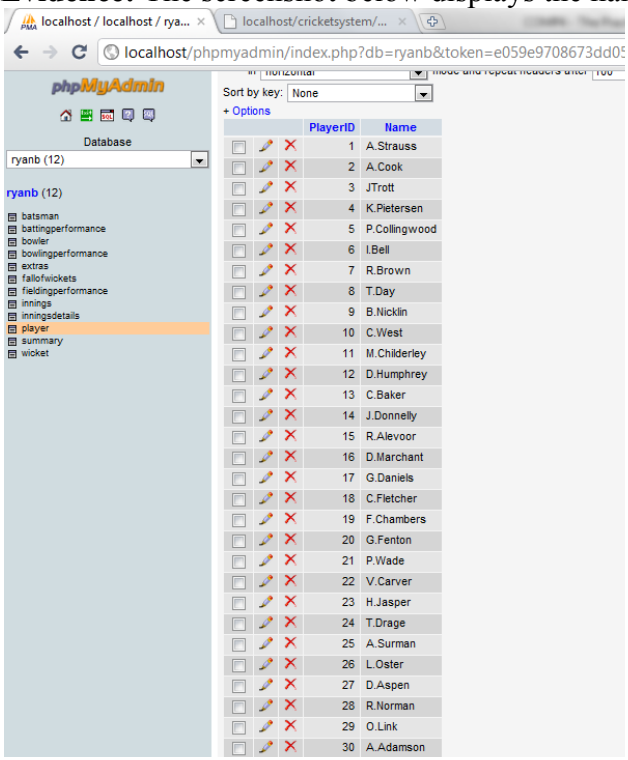
Fulfilled: This objective has not yet been proven. The highest number of scoresheets that have ever been scored on the database as yet is twenty. However, there is no apparent reason why the system should fail this objective. The client's computer should have sufficient memory to store far more than sixty scoresheets if required.
See also section 7.1, questionnaire question 15

1.3.5 – Player Data Storage

Objective: System must store data for a minimum of 30 players.

Fulfilled: This objective has been fulfilled. The system is capable of storing data from at least thirty players and amalgamating it into a set of statistics regarding each player.

Evidence: The screenshot below displays the names of thirty players stored in the database.



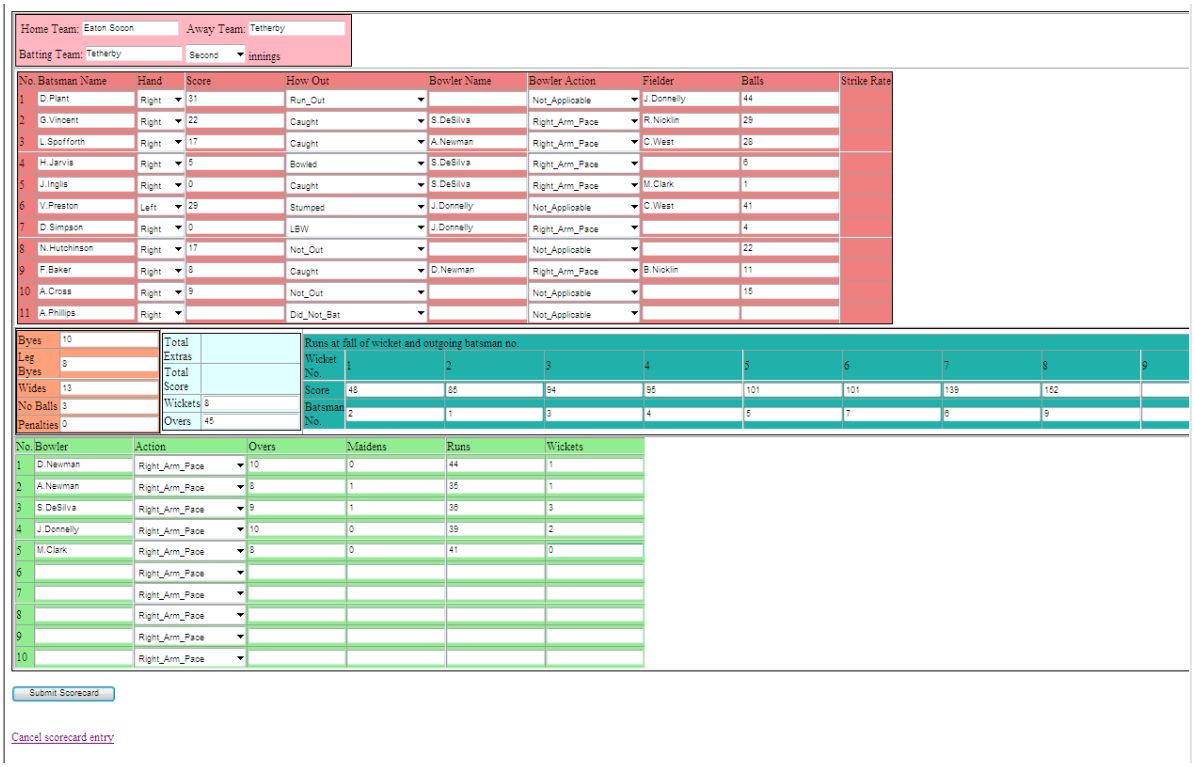
See also section 7.1, questionnaire question 16

1.3.6 – Accurate Data Storage

Objective: System must automatically transfer data from scoresheet component to database component.

Fulfilled: The system effectively receives data through the scorecard form and stores it in the database.

Evidence:



Home Team: Eaton Socon Away Team: Tetherby
Batting Team: Tetherby Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	D.Plant	Right	31	Run_Out		Not_Applicable	J.Donnelly	44	
2	G.Vincent	Right	22	Caught	S.DeSilva	Right_Arm_Pace	R.Nicklin	29	
3	L.Spofforth	Right	17	Caught	A.Newman	Right_Arm_Pace	C.West	28	
4	H.Jarvis	Right	5	Bowled	S.DeSilva	Right_Arm_Pace		6	
5	J.Inglis	Right	0	Caught	S.DeSilva	Right_Arm_Pace	M.Clark	1	
6	V.Preston	Left	29	Stumped	J.Donnelly	Not_Applicable	C.West	41	
7	D.Simpson	Right	0	LBW	J.Donnelly	Right_Arm_Pace		4	
8	N.Hutchinson	Right	17	Not_Out		Not_Applicable		22	
9	F.Baker	Right	8	Caught	D.Newman	Right_Arm_Pace	B.Nicklin	11	
10	A.Cross	Right	9	Not_Out		Not_Applicable		15	
11	A.Phillips	Right		Did_Not_Bat		Not_Applicable			

Byes	10
Leg Byes	8
Wides	13
No Balls	3
Penalties	0

Total Extras	
Total Score	
Wickets	8
Overs	45

Runs at fall of wicket and outgoing batsman no.

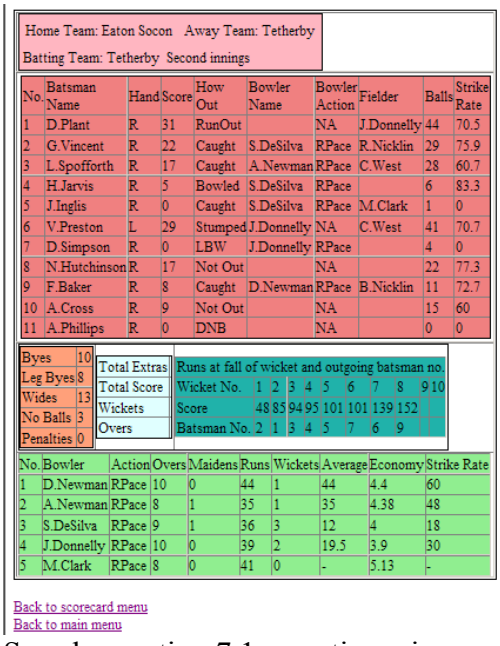
Wicket No.	1	2	3	4	5	6	7	8	9
Score	48	85	94	95	101	101	139	152	
Batsman No.	2	1	3	4	5	7	6	9	

No.	Bowler	Action	Overs	Maidens	Runs	Wickets
1	D.Newman	Right_Arm_Pace	10	0	44	1
2	A.Newman	Right_Arm_Pace	8	1	35	1
3	S.DeSilva	Right_Arm_Pace	9	1	36	3
4	J.Donnelly	Right_Arm_Pace	10	0	39	2
5	M.Clark	Right_Arm_Pace	8	0	41	0
6		Right_Arm_Pace				
7		Right_Arm_Pace				
8		Right_Arm_Pace				
9		Right_Arm_Pace				
10		Right_Arm_Pace				

Submit Scorecard

Cancel scorecard entry

The data from the scorecard above was submitted.



Home Team: Eaton Socon Away Team: Tetherby
Batting Team: Tetherby Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	D.Plant	R	31	RunOut		NA	J.Donnelly	44	70.5
2	G.Vincent	R	22	Caught	S.DeSilva	RPace	R.Nicklin	29	75.9
3	L.Spofforth	R	17	Caught	A.Newman	RPace	C.West	28	60.7
4	H.Jarvis	R	5	Bowled	S.DeSilva	RPace		6	83.3
5	J.Inglis	R	0	Caught	S.DeSilva	RPace	M.Clark	1	0
6	V.Preston	L	29	Stumped	J.Donnelly	NA	C.West	41	70.7
7	D.Simpson	R	0	LBW	J.Donnelly	RPace		4	0
8	N.Hutchinson	R	17	Not Out		NA		22	77.3
9	F.Baker	R	8	Caught	D.Newman	RPace	B.Nicklin	11	72.7
10	A.Cross	R	9	Not Out		NA		15	60
11	A.Phillips	R	0	DNB		NA		0	0

Byes	10
Leg Byes	8
Wides	13
No Balls	3
Penalties	0

Total Extras	
Total Score	
Wickets	
Overs	

Runs at fall of wicket and outgoing batsman no.

Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	48	85	94	95	101	101	139	152		
Batsman No.	2	1	3	4	5	7	6	9		

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	D.Newman	RPace	10	0	44	1	44	4.4	60
2	A.Newman	RPace	8	1	35	1	35	4.38	48
3	S.DeSilva	RPace	9	1	36	3	12	4	18
4	J.Donnelly	RPace	10	0	39	2	19.5	3.9	30
5	M.Clark	RPace	8	0	41	0	-	5.13	-

Back to scorecard menu
Back to main menu

The data from the innings submitted above has been fetched from the database successfully which is prove it has been stored initially in the correct tables.

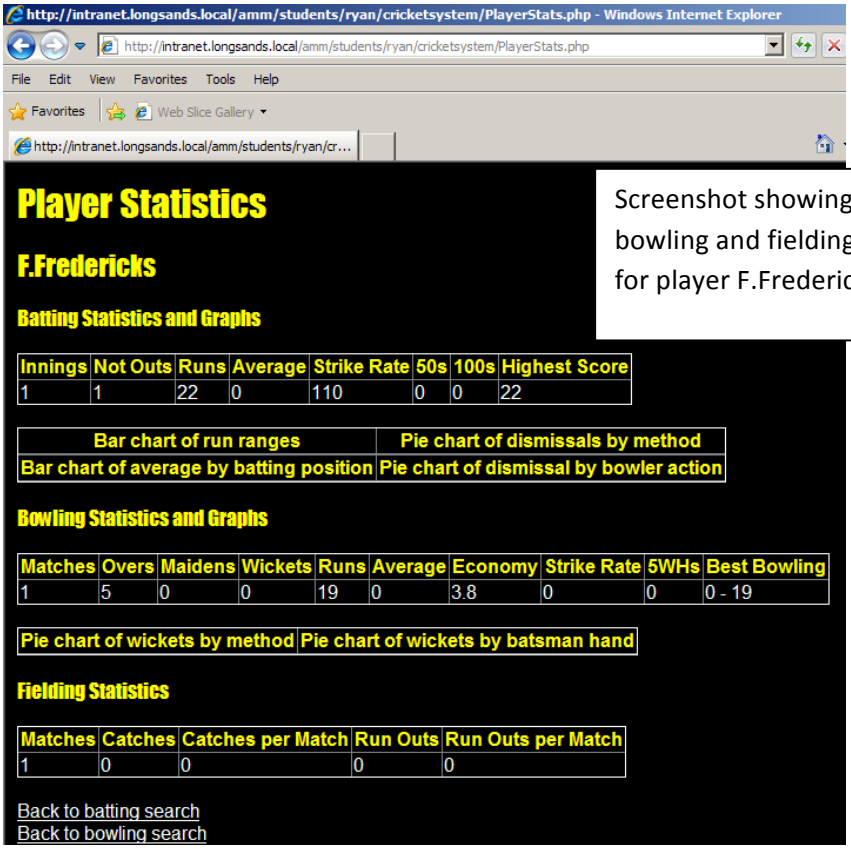
See also section 7.1, questionnaire question 17, in which the client commented that the module for transferring all of the data to the database was apparently "working effectively" which suggests that the client is wholly satisfied that the system has fulfilled this objective.

1.3.7 – Data Amalgamation

Objective: Database must compile data from multiple matches into each player's individual record.

Fulfilled: Each player has an individual profile page generated which contains an amalgamation of all the data recorded on that player.

Evidence:



Screenshot showing all the batting, bowling and fielding data recorded for player F.Fredericks.

See also section 7.1, questionnaire question 18, in which the user comments that "having entered a couple of matches and looked at the profile of a player who has played more than once it seems to be working fine". For this reason they agreed that the system had fully satisfied this objective.

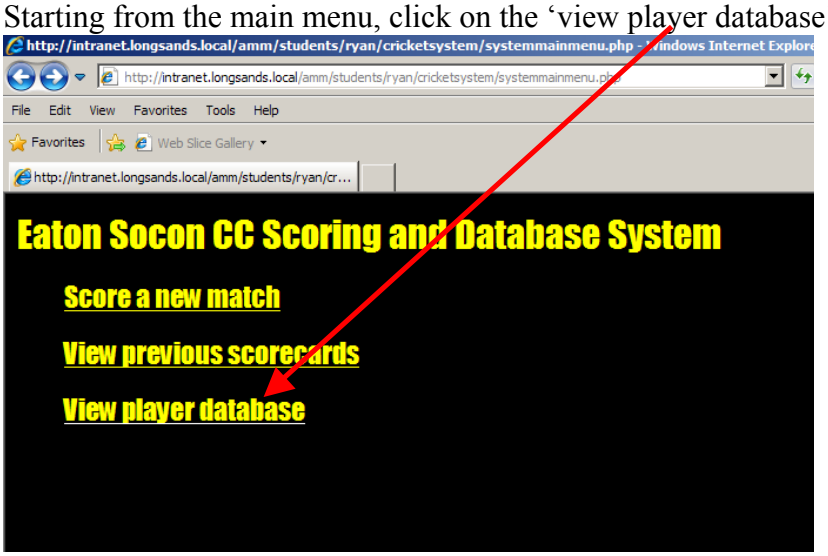
1.3.8 – Player Database Visible

Objective: Database must be visible for the client.

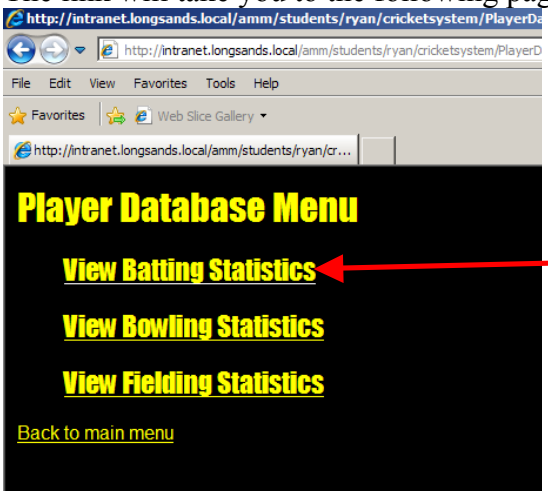
Fulfilled: The database can be accessed easily using the menus on the system.

Evidence:

Starting from the main menu, click on the 'view player database' link as shown below:

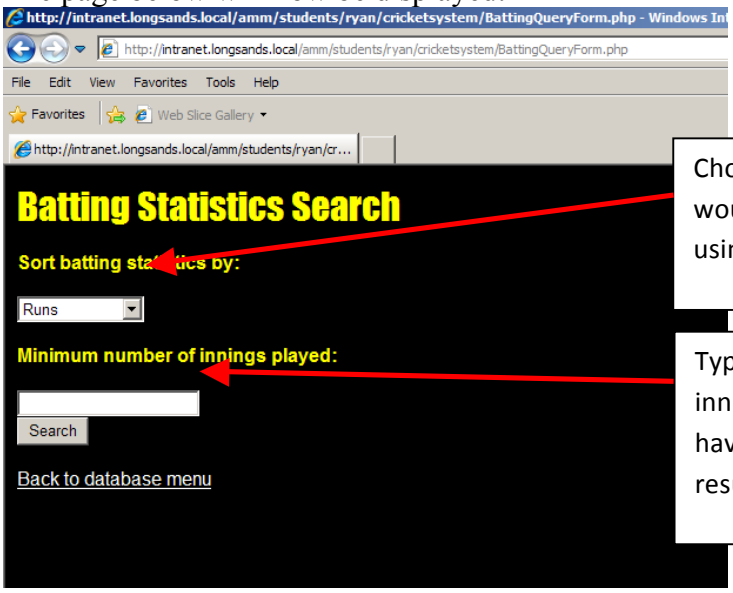


The link will take you to the following page:



Click on the 'View Batting Statistics' link to view the batting statistics section of the system.

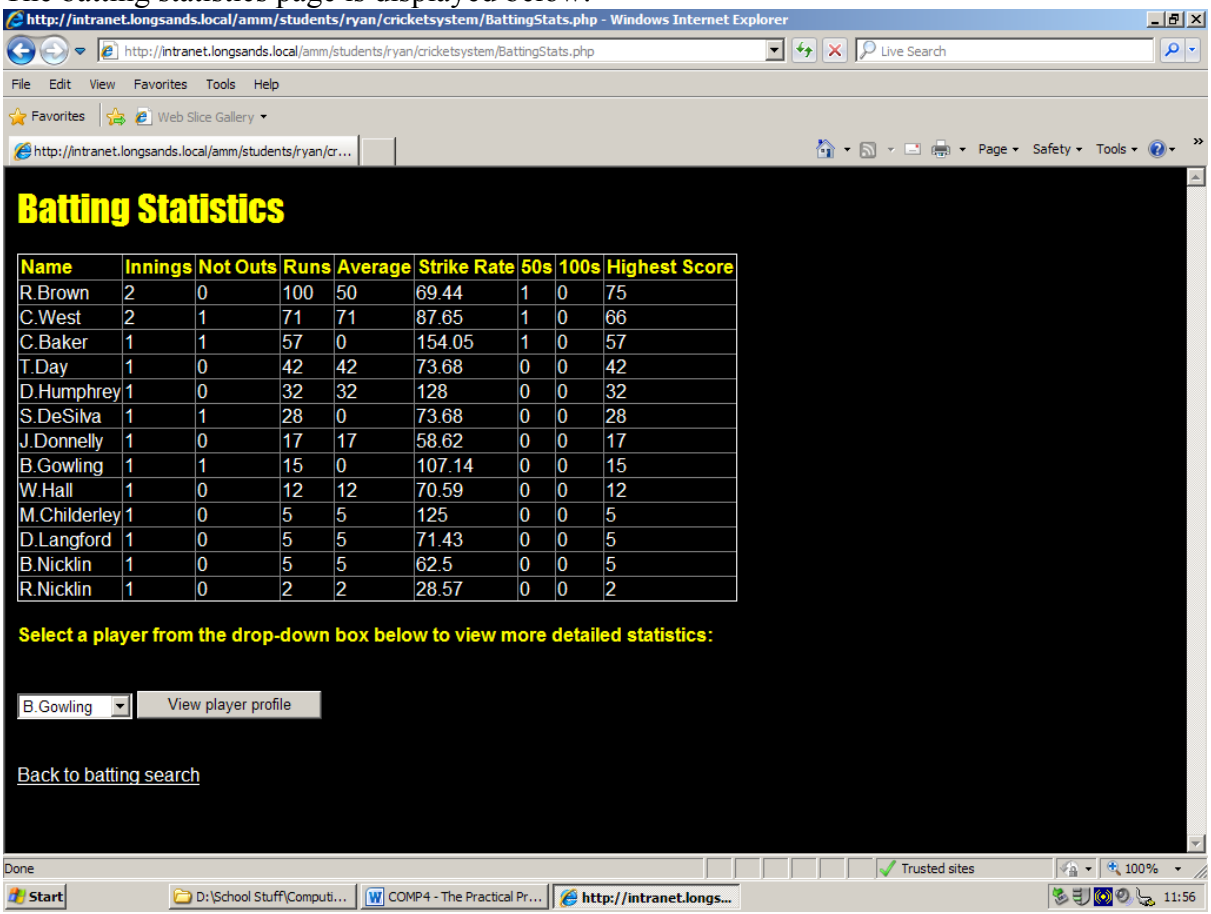
The page below will now be displayed:



Choose the category by which you would like to sort the results by using the drop down box.

Type in the minimum number of innings required the batsmen must have played to appear in the search results on the next page.

Click on the search button to run the search and progress to the batting statistics page. The batting statistics page is displayed below:



Name	Innings	Not Outs	Runs	Average	Strike Rate	50s	100s	Highest Score
R.Brown	2	0	100	50	69.44	1	0	75
C.West	2	1	71	71	87.65	1	0	66
C.Baker	1	1	57	0	154.05	1	0	57
T.Day	1	0	42	42	73.68	0	0	42
D.Humphrey	1	0	32	32	128	0	0	32
S.DeSilva	1	1	28	0	73.68	0	0	28
J.Donnelly	1	0	17	17	58.62	0	0	17
B.Gowling	1	1	15	0	107.14	0	0	15
W.Hall	1	0	12	12	70.59	0	0	12
M.Childerley	1	0	5	5	125	0	0	5
D.Langford	1	0	5	5	71.43	0	0	5
B.Nicklin	1	0	5	5	62.5	0	0	5
R.Nicklin	1	0	2	2	28.57	0	0	2

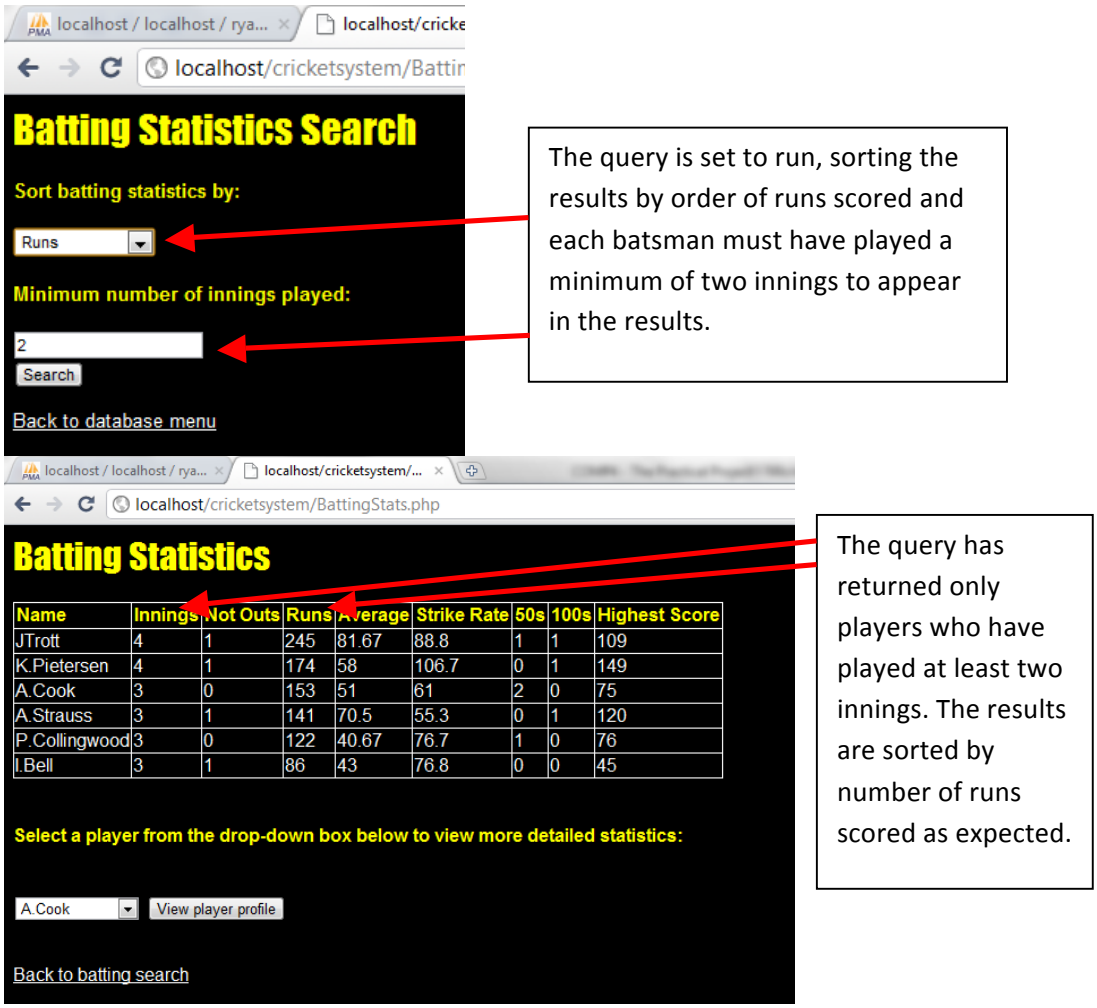
See also section 7.1, questionnaire question 19, in response to which the user commented that "I can access the stats parts easily using the menus and search pages", indicating that the system had satisfied this objective because of the helpful menu structure.

1.3.9 – Pre-set Queries

Objective: Database must be able to run pre-set queries to obtain useful statistics for the client.

Fulfilled: This objective has been fulfilled by the implementation of three pages which allow the user to submit some parameters for use in querying either the batting, bowling or fielding statistical parts of the database. A pre-designed query is then used to search the database according to the user set parameters.

Evidence:



See also section 7.1, questionnaire question 20, in which the client noted that "The system fetches all the data I wanted to see on the combined stats lists". This shows that the system achieves this objective because it ensures that the data returned by the database is suitable for the client's need.

1.4 – Other Objectives

1.4.1 – Graphical Data Output

Objective: System could present an output page with a compilation of stats from a player and some graphs showing various other statistics.

Fulfilled: This objective has not been met due to the time constraints of the course. Although there are individual player pages, the graphical sections are at the time of writing still awaiting development.
See also section 7.1, questionnaire question 21

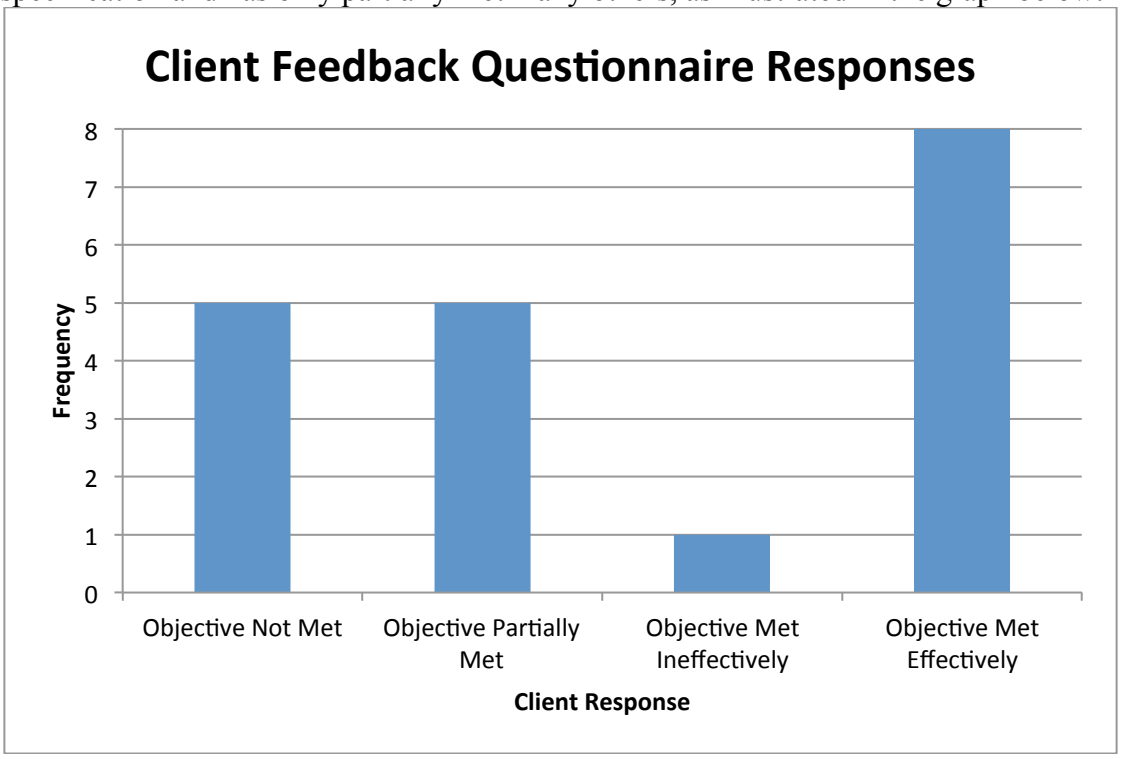
1.4.2 – Multiple Season Storage

Objective: System could be expanded to store and process data from multiple seasons of matches.

Fulfilled: This objective has not been met. Although the system should be able to store sufficient games to store multiple seasons, there is no mechanism to allow the user to differentiate between seasons when viewing the statistics.
See also section 7.1, questionnaire question 22

1.5 – Summary

Unfortunately, the system has failed to meet many of the objectives set in the system specification and has only partially met many others, as illustrated in the graph below:



As you can see, ten out of nineteen objectives have been achieved only partially or not at all by the system. This has occurred due to a variety of reasons. Firstly, the switch away from ball-by-ball match processing made a number of the objectives void straight away and therefore some of the original objectives were not met for this reason. However, perhaps more disappointingly, several objectives were only partially met because of an oversight by the developer when designing the database part of the system, which resulted in the system failing to store some of the data stipulated as required by the user. Another reason for the failure of some of the objectives was the insufficient validation on the scorecard page, which meant that human error prevention, a major theme in the objectives, was not achieved as far as it should have been by the system.

Overall, I am forced to conclude that the system does not meet the original requirements specified by the client, but the client is aware of the reasons for these issues and has chosen to accept the system anyway because it is still an improvement on the current method of compiling statistics on each player.

2 – Effectiveness

2.1 – General Objectives

2.1.1 – Interface

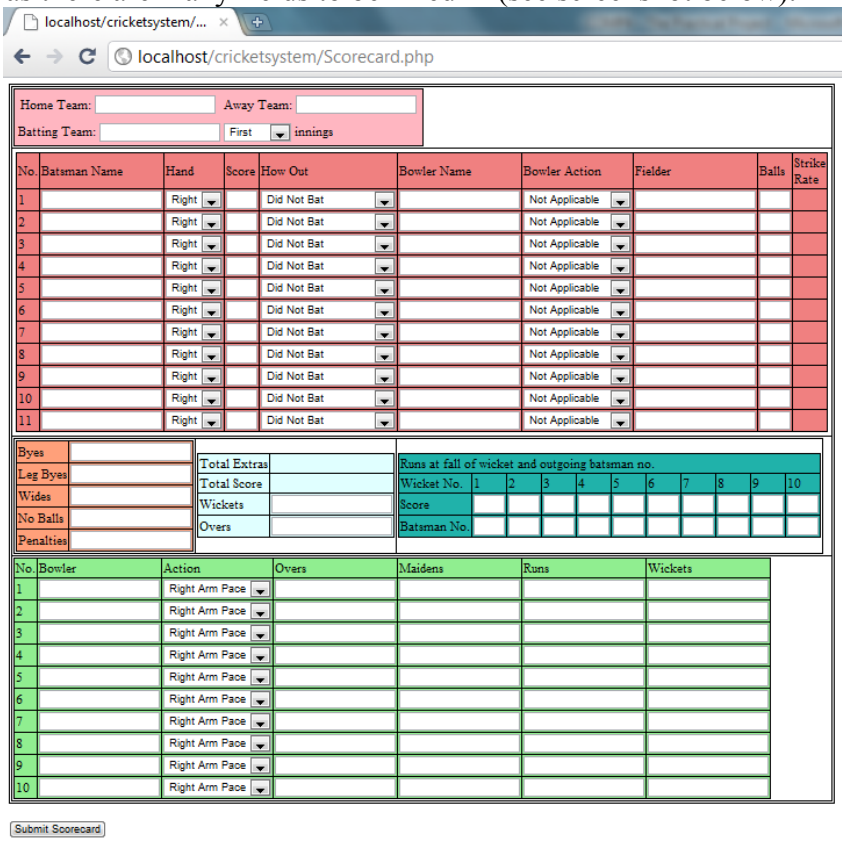
Objective: Easy to use interface so that inexperienced computer users can manage with little training.

Evaluation Criteria:

- System can be navigated easily.
- Data can be input quickly and efficiently.
- Database information can be comprehended easily.

Judgement and evidence:

The system interface is for the most part effective. The system can be navigated quite easily using the hyperlinks and buttons without much training and the database information is logically displayed in a clear tabular format.The client's response to the questionnaire (see section 7.1, question 1) supports this assertion. The client also goes on to say that while it is reasonably easy to input data using the scorecard it is somewhat time consuming. This is a fair cricticism as there are many fields to be filled in (see screenshot below).



Therefore the system has not completely achieved the objective of having an easy to use interface because whilst the interface is simple it is not convenient to use in the case of the scorecard, which as noted by the client is not an effective solution for their needs due to the fact is is extremely time consuming to submit data through.

2.1.2 – Menu Structure

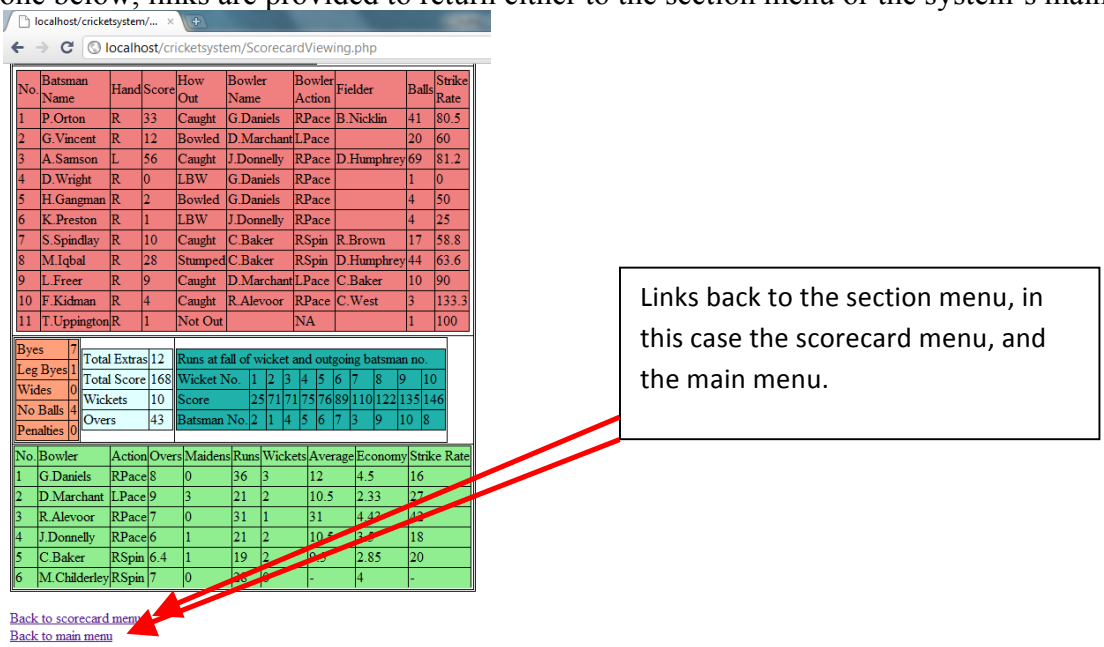
Objective: Straightforward menu structure with useful and informative prompts.

Evaluation Criteria:

- Links to all areas of the system are informatively labelled.
- The user can always move forwards or backwards along the system easily.

Judgement and evidence:

The system has got an informatively labelled menu structure which for the most part always gives the option for the user to navigate easily around the system. On most pages, such as the one below, links are provided to return either to the section menu or the system's main menu.



No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	P.Orton	R	33	Caught	G.Daniels	RPace	B.Nicklin	41	80.5
2	G.Vincent	R	12	Bowled	D.Marchant	LPace		20	60
3	A.Samson	L	56	Caught	J.Donnelly	RPace	D.Humphrey	69	81.2
4	D.Wright	R	0	LBW	G.Daniels	RPace		1	0
5	H.Gangman	R	2	Bowled	G.Daniels	RPace		4	50
6	K.Preston	R	1	LBW	J.Donnelly	RPace		4	25
7	S.Spindlay	R	10	Caught	C.Baker	RSpin	R.Brown	17	58.8
8	M.Iqbal	R	28	Stumped	C.Baker	RSpin	D.Humphrey	44	63.6
9	L.Freer	R	9	Caught	D.Marchant	LPace	C.Baker	10	90
10	F.Kidman	R	4	Caught	R.Alevoor	RPace	C.West	3	133.3
11	T.Uppington	R	1	Not Out		NA		1	100

Byes	7
Leg Byes	1
Wides	0
No Balls	4
Penalties	0

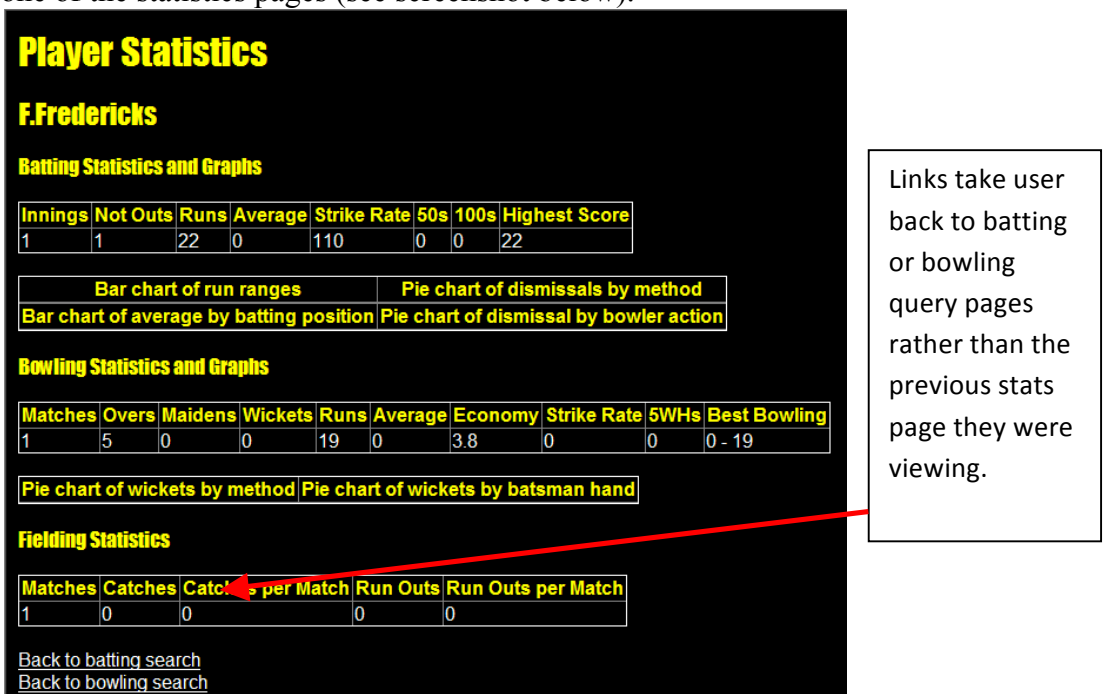
Total Extras	12
Total Score	168
Wickets	10
Overs	43

Runs at fall of wicket and outgoing batsman no.										
Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	25	71	71	75	76	89	110	122	135	146
Batsman No.	2	1	4	5	6	7	3	9	10	8

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	G.Daniels	RPace	8	0	36	3	12	4.5	16
2	D.Marchant	LPace	9	3	21	2	10.5	2.33	27
3	R.Alevoor	RPace	7	0	31	1	31	4.42	42
4	J.Donnelly	RPace	6	1	21	2	10.5	3.5	18
5	C.Baker	RSpin	6.4	1	19	2	9.5	2.85	20
6	M.Childerley	RSpin	7	0	36	0	-	4	-

However, there is one element of the menu structure which limits the effectiveness of the system's fulfilment of this objective, which is that on the individual player stats pages, the user has to return to the query pages rather than back to the page they have just left.

This means they have to run the query every time they want to generate a list of players on one of the statistics pages (see screenshot below).



Player Statistics

F.Fredericks

Batting Statistics and Graphs

Innings	Not Outs	Runs	Average	Strike Rate	50s	100s	Highest Score
1	1	22	0	110	0	0	22

Bar chart of run ranges	Pie chart of dismissals by method
Bar chart of average by batting position	Pie chart of dismissal by bowler action

Bowling Statistics and Graphs

Matches	Overs	Maidens	Wickets	Runs	Average	Economy	Strike Rate	5WHs	Best Bowling
1	5	0	0	19	0	3.8	0	0	0 - 19

Pie chart of wickets by method	Pie chart of wickets by batsman hand

Fielding Statistics

Matches	Catches	Catches per Match	Run Outs	Run Outs per Match
1	0	0	0	0

Back to batting search
Back to bowling search

Links take user back to batting or bowling query pages rather than the previous stats page they were viewing.

Generally, the menu structure is successful in effectively achieving this objective. It is easily navigable in both directions with the single exception mentioned above. The user clearly supports the idea that the system provides an effective solution of the objective (section 7.1, question 2), stating that "most of the links and buttons are self explanatory and helpfully labelled", indicating that the system has proved effective in fulfilling this objective.

2.1.3 – Eliminating Human Error

Objective: Reduce human error as much as possible by having most processes undertaken by computer.

Evaluation Criteria:

- As much processing as possible is undertaken by the computer.
- The user should not have to perform any mathematical calculations at all.
- Where possible, drop down menus should be used rather than text fields for input.
- Data duplication should be avoided.

Judgement and evaluation

The system has not provided an effective fulfilment of this objective. Due to the change from ball-by-ball processing, a scorer is now still required to fill in a scorecard as in the existing system, therefore clearly the capacity has not been eliminated effectively. Although some of the criteria have been fulfilled, such as using drop down menus where possible, there is far too much calculation and data duplication required on the user's part to suggest that the system has come anywhere near effectively achieving the objective. This finding is supported by the user's questionnaire response from section 7.1, question 3, in which they answered that the system had completely failed to meet this objective.

2.1.4 – Validation

Objective: Sufficient validation to prevent as many mistakes as possible.

Evaluation Criteria:

- All required fields should have presence checks on them.
- All fields should have data type checks on them.
- All numeric entry fields should have reasonable range checks on them.

Judgement and evaluation

There is some validation present on the system, but it is not sufficient to prevent the user from entering inaccurate data. Although the system fulfils the requirements of having presence and data type checks on the required fields, there are no range checks on the appropriate fields, which seriously undermines its effectiveness, as mentioned by the client in their questionnaire response (see section 7.1 question 4). The client also commented that "to be really useful it needs to provide suggestions from the database when filling in names to prevent me from storing a different player due to making a typo when entering the name". Therefore the system has not achieved this objective effectively because the validation does not fulfil the evaluation cricteria and has the further weakness pointed out by the user that there is no facility for accurately entering details for a player who is already present in the database.

2.1.5 – Fast Response

Objective: System must be fast to use so that data can be recorded between balls.
This objective no longer applies to the system.

2.2 – Specific Objectives

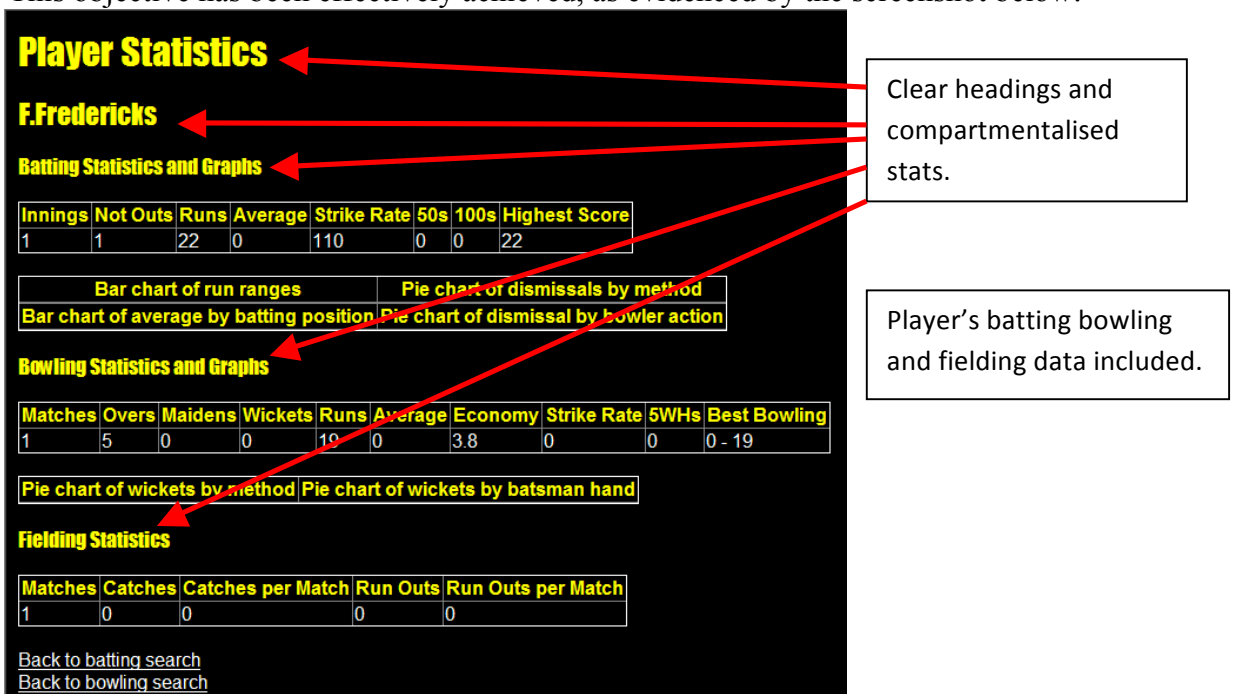
2.2.1 – Player Statistics Pages Present

Objective: User should be able to view a well set out page of statistics for each player on record.

Evaluation Criteria:

- Are clear headings provided and the statistics neatly compartmentalised to allow for easy comprehension?
- Is all relevant data provided?
- Can all players' statistics be viewed?

Judgement and evidence:
This objective has been effectively achieved, as evidenced by the screenshot below:



My testing programme (see testing section 3.1) proves that all players' individual stats pages can be accessed effectively. Therefore, it is left to conclude that the system has effectively fulfilled this objective, a finding that is supported by the client's questionnaire responses (see section 7.1 question 6). The client answered that the objective had been achieved fully and effectively, with a clear layout and each player's data provided.

2.2.2 – Scorecard Layout

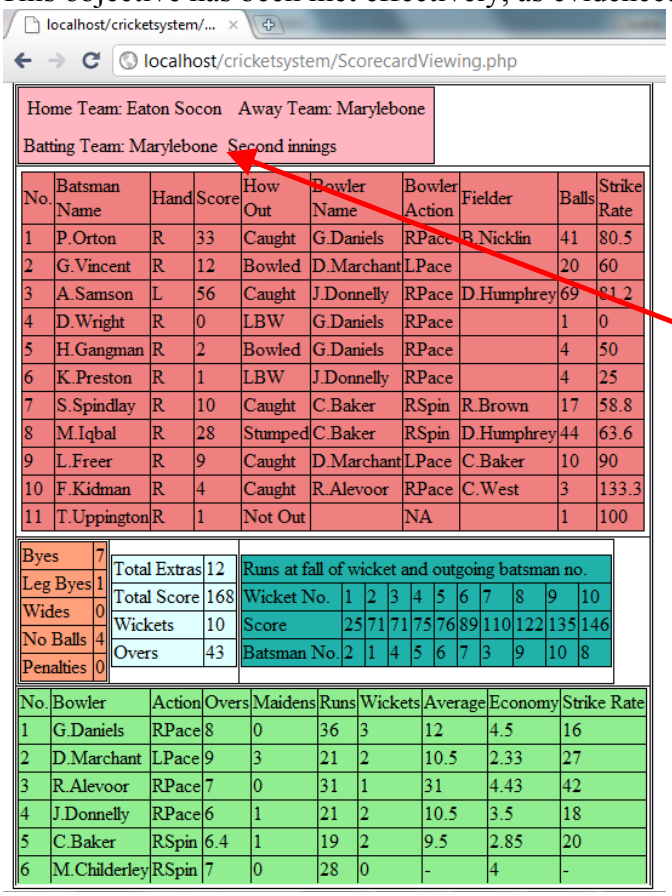
Objective: Score sheet should be simple and clear but informative.

Evaluation Criteria:

- Is the scoresheet provided with adequate column headings?
- Is all the text easily legible?
- Is all the information you would expect to find on a traditional scorecard found on it?
- Is the scoresheet separated into relevant compartments in a similar manner to a traditional scoresheet?

Judgement and evidence:

This objective has been met effectively, as evidenced by the screenshot below:



localhost/cricketsystem/...

localhost/cricketsystem/ScorecardViewing.php

Home Team: Eaton Socon Away Team: Marylebone

Batting Team: Marylebone Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	P.Orton	R	33	Caught	G.Daniels	RPace	B.Nicklin	41	80.5
2	G.Vincent	R	12	Bowled	D.Marchant	LPace		20	60
3	A.Samson	L	56	Caught	J.Donnelly	RPace	D.Humphrey	69	81.2
4	D.Wright	R	0	LBW	G.Daniels	RPace		1	0
5	H.Gangman	R	2	Bowled	G.Daniels	RPace		4	50
6	K.Preston	R	1	LBW	J.Donnelly	RPace		4	25
7	S.Spindlay	R	10	Caught	C.Baker	RSpin	R.Brown	17	58.8
8	M.Iqbal	R	28	Stumped	C.Baker	RSpin	D.Humphrey	44	63.6
9	L.Freer	R	9	Caught	D.Marchant	LPace	C.Baker	10	90
10	F.Kidman	R	4	Caught	R.Alevoor	RPace	C.West	3	133.3
11	T.Uppington	R	1	Not Out		NA		1	100

Byes	7
Leg Byes	1
Wides	0
No Balls	4
Penalties	0

Total Extras	12
Total Score	168
Wickets	10
Overs	43

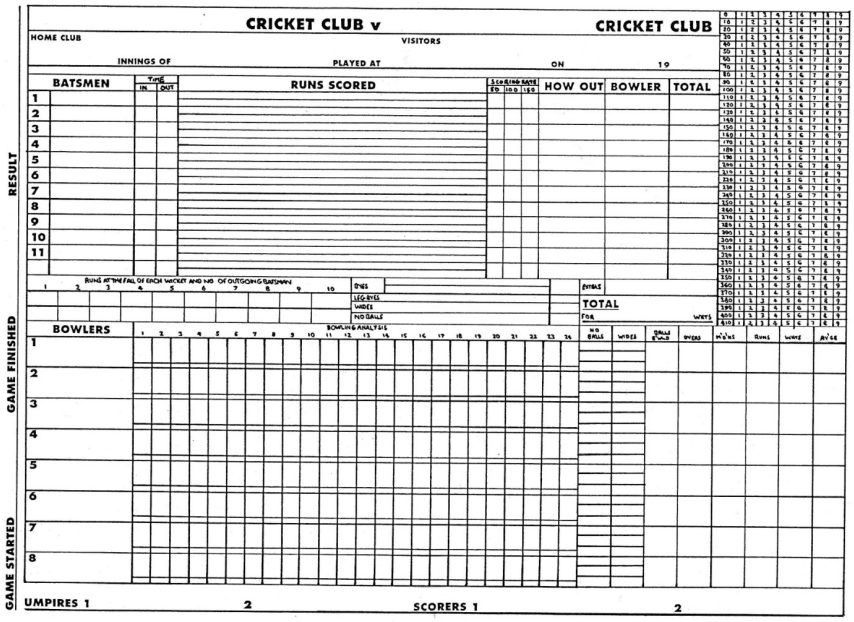
Runs at fall of wicket and outgoing batsman no.										
Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	25	71	71	75	76	89	110	122	135	146
Batsman No.	2	1	4	5	6	7	3	9	10	8

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	G.Daniels	RPace	8	0	36	3	12	4.5	16
2	D.Marchant	LPace	9	3	21	2	10.5	2.33	27
3	R.Alevoor	RPace	7	0	31	1	31	4.43	42
4	J.Donnelly	RPace	6	1	21	2	10.5	3.5	18
5	C.Baker	RSpin	6.4	1	19	2	9.5	2.85	20
6	M.Childerley	RSpin	7	0	28	0	-	4	-

The scoresheet is for the most part labelled with informative column headings which match the traditional scorecard below as far as possible.

All the text is easily legible except for the possibility of confusion over whether the batting team name runs into the innings number.

Most of the sections contained on the traditional scorecard are also found on the system card and in fact the system card holds some extra information. They are also laid out in a very similar manner.



Therefore I would argue that the system has proved effective in fulfilling this objective. This view is supported by the client's response to the questionnaire (see section 7.1 question 7) which notes the similarities between the traditional scorecard and the system version, therefore making it easy for them to use. This led the client to support my findings by responding that this objective had been achieved effectively on the questionnaire.

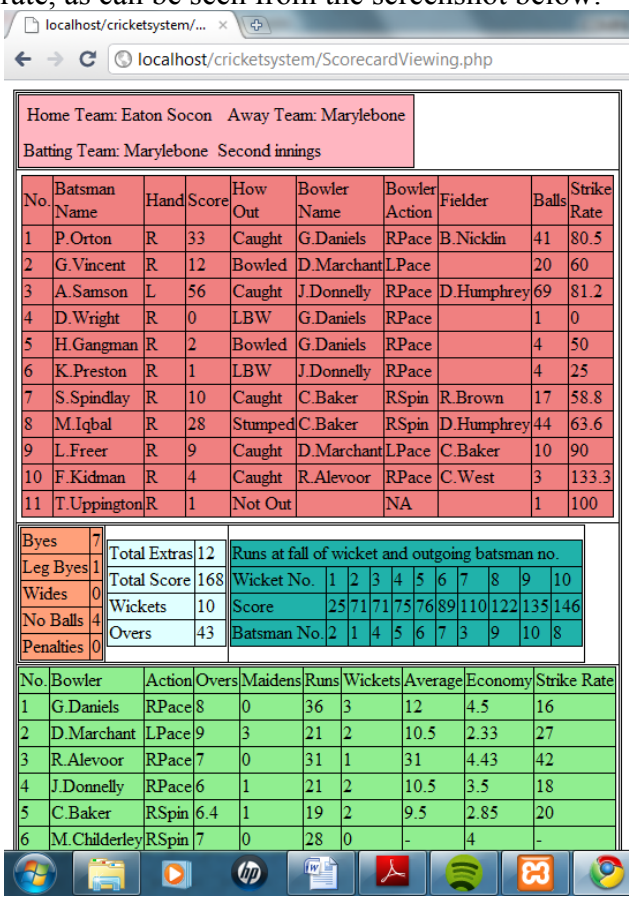
2.2.3 – Relevant Innings Data Present

Objective: Score sheet should contain details of: player names; team names; batsmen's scores; dismissal methods; bowler's figures; extras conceded; run rates; strike rates; economy rates.

Evaluation Criteria:

- Is all of this data found on the scorecard?
- Can it all be found and read easily?

This objective has been achieved for the most part. The only item missing is the innings run rate, as can be seen from the screenshot below:



All of the specified data can be found on the scorecard and it is all easily legible.

With the exception of the absence of the run rate figure, I would argue that the system has provided an effective solution to this objective, which is largely supported by the client's response to the questionnaire (see section 7.1 question 8), in which he stated that all of the data he required was present except for the innings run rates. This leads me to conclude that while only part of this objective was fulfilled, those areas that were achieved were achieved effectively.

2.2.4 – Player Database Stats Pages Contain Relevant Detail

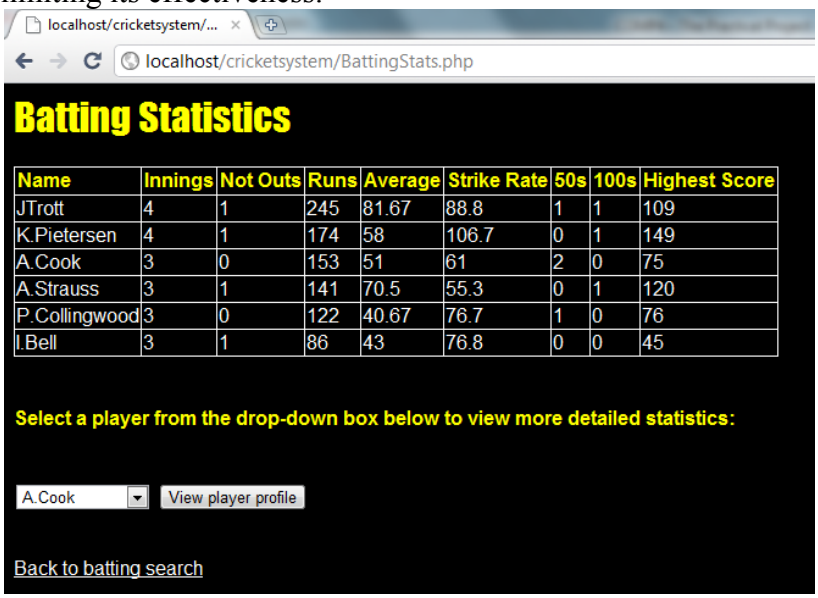
Objective: Player records should store details of games played, total runs, total innings, not outs, batting average, 50's, 100's, strike rate, ducks, run ranges, dismissal methods, overs bowled, wickets taken, runs conceded, maidens bowled, bowling average, five wicket hauls, economy rate, best bowling, strike rate, catches taken and run-outs effected.

Evaluation Criteria:

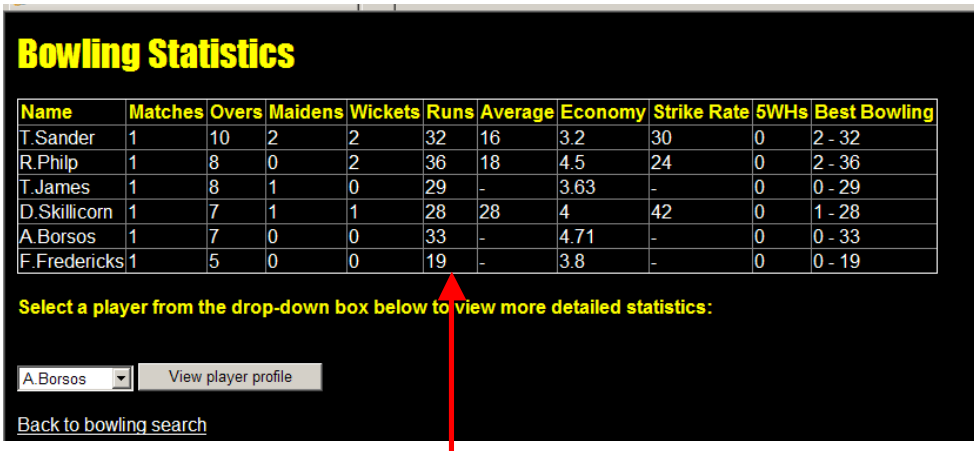
- Can all this data be found on the relevant statistical pages?

- Is the data easy to find and read?
- Is it organised in a logical fashion?

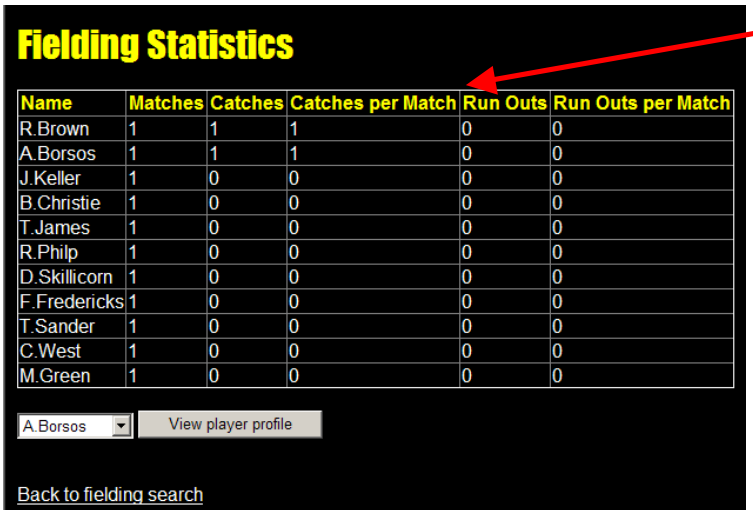
Judgement and evidence:
This objective has for the most part been effectively achieved by the system, as evidenced by the three screenshots below. Unfortunately, the specified stats regarding run ranges and the number of ducks scored aren't provided by the system at this moment in time, thereny limiting its effectiveness.



All of the specified information relating to each player's batting performances can be found on this page, arranged into a tabular format with clear headings. The number of ducks scored by each batsman and the run ranges achieved by each batsman have been omitted.



This table contains data on the number of matches played by each player, the number of overs bowled, maidens bowled, wickets taken, runs conceded, bowling averages, bowling economy rates, bowling strike rates, five wicket hauls and best bowling figures, arranged in a tabular format with clear headings.



Fielding Statistics

Name	Matches	Catches	Catches per Match	Run Outs	Run Outs per Match
R.Brown	1	1	1	0	0
A.Borsos	1	1	1	0	0
J.Keller	1	0	0	0	0
B.Christie	1	0	0	0	0
T.James	1	0	0	0	0
R.Philp	1	0	0	0	0
D.Skillicorn	1	0	0	0	0
F.Fredericks	1	0	0	0	0
T.Sander	1	0	0	0	0
C.West	1	0	0	0	0
M.Green	1	0	0	0	0

A.Borsos | View player profile

Back to fielding search

The client's response to the questionnaire supports the verdict that the system would have effectively met the objective if not for the omission of the ducks and run range data (see section 7.1 question 9). The client comments that the page "provides all the data I asked for except ducks and run ranges". This leads me to conclude that although the system has only partially fulfilled this objective, those areas which have been achieved have been achieved effectively.

2.2.5 – Fast and Simple Data Input

Objective: User should be able to record the result of each ball with one key press and a confirmation key press; except for in exceptional circumstances e.g. wickets, extras.
This objective no longer applies to the system.

2.2.6 – Complex Data Calculated by System

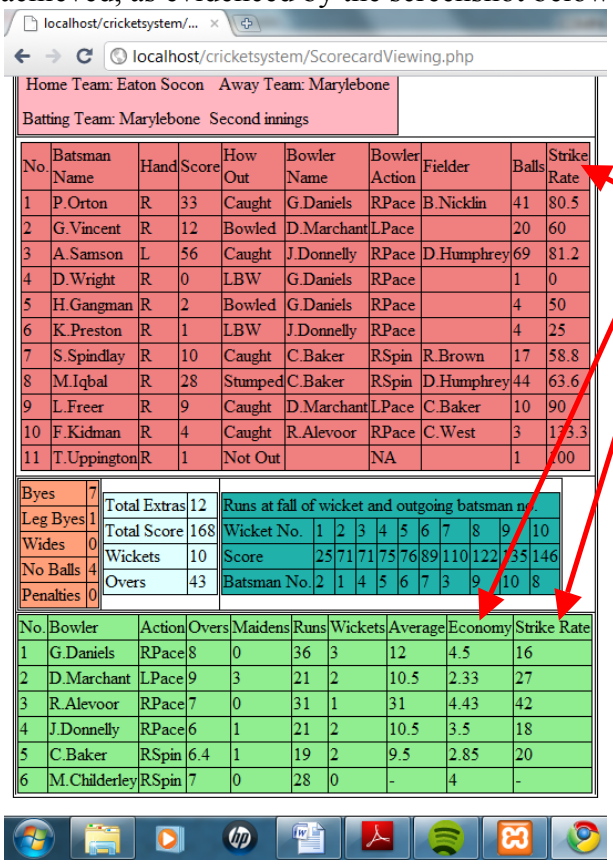
Objective: System should process data to calculate run rates, economy rates and strike rates.

Evaluation Criteria:

- Are all of these figures calculated by the system?
- Are these figures displayed to the user in a convenient fashion?

Judgement and evidence:
This objective has not been met due to the absence of the run rate calculation from the system.

However, for the other two requirements of the objective an effective solution has been achieved, as evidenced by the screenshot below:



Batting and bowling strike rates and bowling economies have all been accurately calculated and displayed to the user with a good level of legibility.

Although the system has failed to meet the entire actual objective, an effective calculation and display of the strike rate and economy has been achieved. In the client's response to the questionnaire (see section 7.1 question 11), he incorrectly responds that the system has completely and effectively fulfilled this objective when in fact it has not done so due to the omission of the run rate calculations, but this at least indicates that the strike rates and economies are being produced and displayed effectively.

2.3 – Core Objectives

2.3.1 – Scoring a Match

Objective: System must be able to keep score of matches using input from a scorer.
This objective no longer applies to the system.

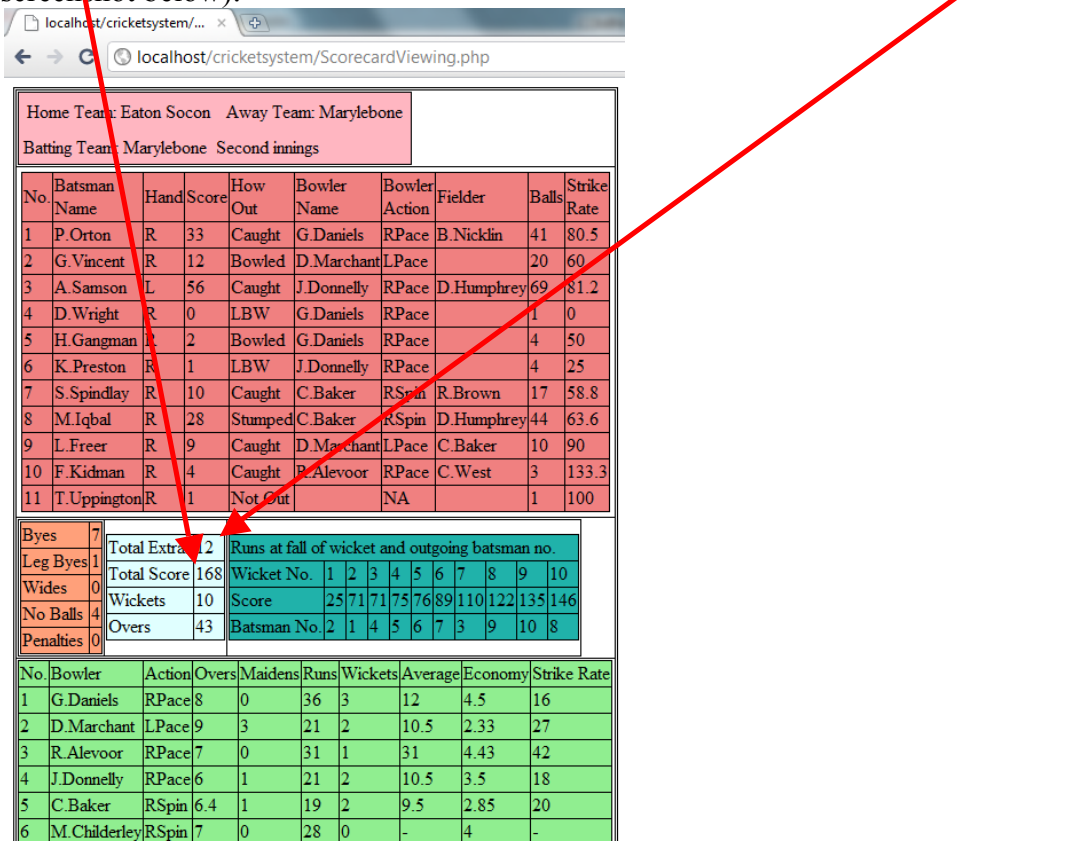
2.3.2 – Calculating Scores

Objective: System must calculate player scores, extras and total team scores.

Evaluation Criteria:

- Are all of these values calculated by the system?
- Are they all displayed to the user in a convenient fashion?

Judgement and evidence:
Although the system has mostly failed to meet the objective, the total number of extras and team score is calculated effectively by the system and displayed through the scorecard (see screenshot below):



localhost/cricketsystem/ScorecardViewing.php

Home Team: Eaton Socon Away Team: Marylebone
Batting Team: Marylebone Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	P.Orton	R	33	Caught	G.Daniels	RPace	B.Nicklin	41	80.5
2	G.Vincent	R	12	Bowled	D.Marchant	LPace		20	60
3	A.Samson	L	56	Caught	J.Donnelly	RPace	D.Humphrey	69	81.2
4	D.Wright	R	0	LBW	G.Daniels	RPace		1	0
5	H.Gangman	R	2	Bowled	G.Daniels	RPace		4	50
6	K.Preston	R	1	LBW	J.Donnelly	RPace		4	25
7	S.Spindlay	R	10	Caught	C.Baker	RSpin	R.Brown	17	58.8
8	M.Iqbal	R	28	Stumped	C.Baker	RSpin	D.Humphrey	44	63.6
9	L.Freer	R	9	Caught	D.Marchant	LPace	C.Baker	10	90
10	F.Kidman	R	4	Caught	R.Alevoor	RPace	C.West	3	133.3
11	T.Uppington	R	1	Not Out		NA		1	100

Byes	7
Leg Byes	1
Wides	0
No Balls	4
Penalties	0

Total Extras	12
Total Score	168
Wickets	10
Overs	43

Runs at fall of wicket and outgoing batsman no.

Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	25	71	71	75	76	89	110	122	135	146
Batsman No.	2	1	4	5	6	7	3	9	10	8

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	G.Daniels	RPace	8	0	36	3	12	4.5	16
2	D.Marchant	LPace	9	3	21	2	10.5	2.33	27
3	R.Alevoor	RPace	7	0	31	1	31	4.43	42
4	J.Donnelly	RPace	6	1	21	2	10.5	3.5	18
5	C.Baker	RSpin	6.4	1	19	2	9.5	2.85	20
6	M.Childerley	RSpin	7	0	28	0	-	4	-

2.3.3 – Calculating Bowling Figures

Objective: System must calculate bowling figures.
This objective no longer applies to the system.

2.3.4 – Scoresheet Storage

Objective: System must be able to store a minimum of 60 score sheets.

Evaluation Criteria:

- At least sixty innings can be stored on the system.
- All of these innings can be accessed and viewed again in a straight forward fashion.

Judgement and evidence:
Although the system hasn't yet stored sixty innings, there is no reason why this shouldn't be possible. However, its effectiveness may be limited by the fact that with sixty innings present the innings menu may become difficult to use because the table and the drop down menu will hold so many records.

2.3.5 – Player Data Storage

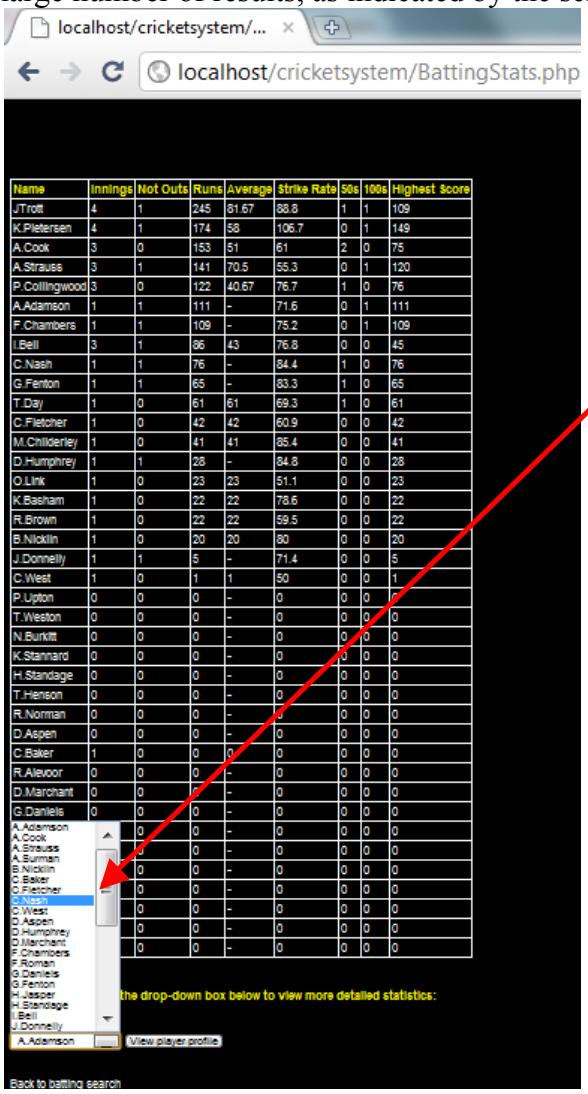
Objective: System must store data for a minimum of 30 players.

Evaluation Criteria:

- At least thirty players and their performances can be stored on the database.
- All of their batting, bowling and fielding stats can be accessed using the system.

- All of the players have their own individual pages which can be accessed easily through the system.

Judgement and evidence:
The system has fulfilled the objective of being able to store more than thirty players, their individual player pages are not necessarily easy to access when using a query which returns a large number of results, as indicated by the screenshot below:



All of the players are present in the table and their statistics calculated effectively, but there are so many names in the drop down menu it is difficult to access the individual player pages.

Therefore, the system has not achieved this objective as effectively as it might have done. The user has not yet reached the point where the number of players present in the database becomes an issue.

2.3.6 – Accurate Data Storage

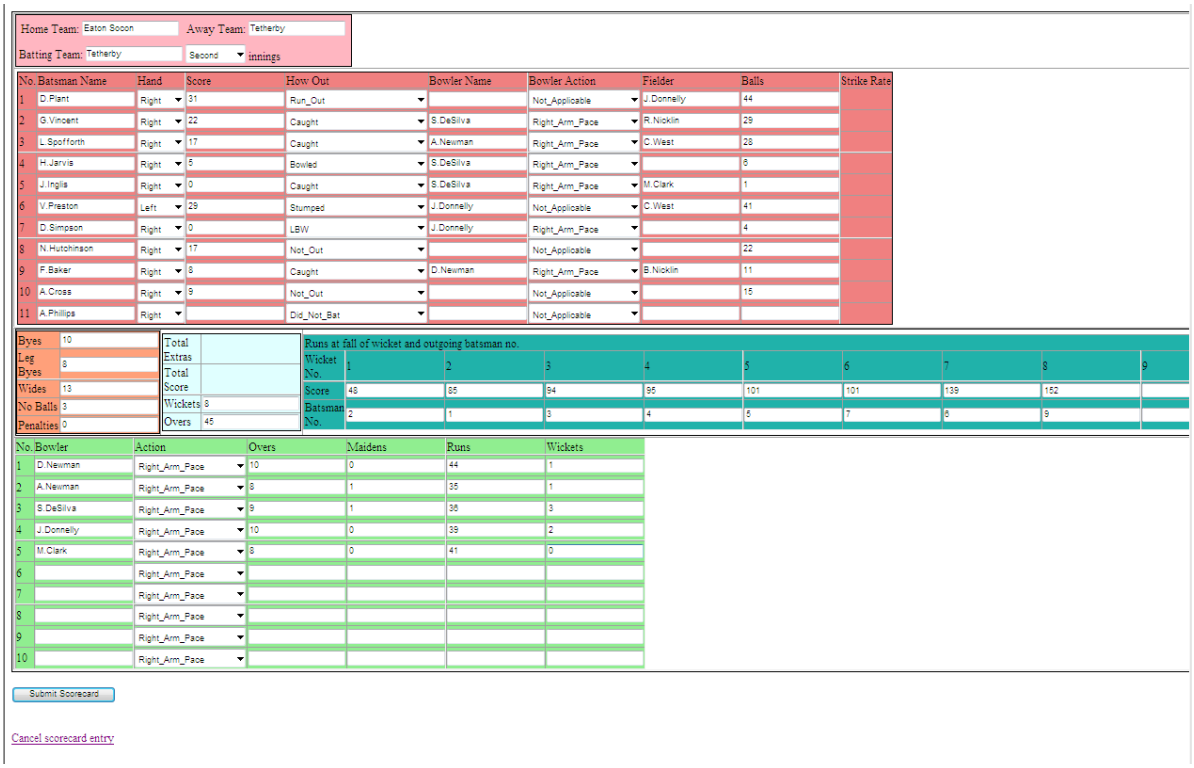
Objective: System must automatically transfer data from scoresheet component to database component.

Evaluation Criteria:

- Is all of the data entered in the scorecard stored in the correct location on the database?
- Does data storage occur in a reasonable period of time?

Judgement and evidence:

The screenshots below provide evidence for the success of the system in storing innings data to the database:



Home Team: Eaton Socon Away Team: Tetherby

Batting Team: Tetherby Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	D.Plant	Right	31	Run_Out		Not_Applicable	J.Donnelly	44	
2	G.Vincent	Right	22	Caught	S.DeSilva	Right_Arm_Pace	R.Nicklin	29	
3	L.Spofforth	Right	17	Caught	A.Newman	Right_Arm_Pace	C.West	28	
4	H.Jarvis	Right	5	Bowled	S.DeSilva	Right_Arm_Pace		6	
5	J.Inglis	Right	0	Caught	S.DeSilva	Right_Arm_Pace	M.Clark	1	
6	V.Preston	Left	29	Stumped	J.Donnelly	Not_Applicable	C.West	41	
7	D.Simpson	Right	0	LBW	J.Donnelly	Right_Arm_Pace		4	
8	N.Hutchinson	Right	17	Not_Out		Not_Applicable		22	
9	F.Baker	Right	8	Caught	D.Newman	Right_Arm_Pace	B.Nicklin	11	
10	A.Cross	Right	9	Not_Out		Not_Applicable		15	
11	A.Phillips	Right		Did_Not_Bat		Not_Applicable			

Byes	10
Leg Byes	8
Wides	13
No Balls	3
Penalties	0

Total Extras	
Total Score	
Wickets	8
Overs	45

Runs at fall of wicket and outgoing batsman no.

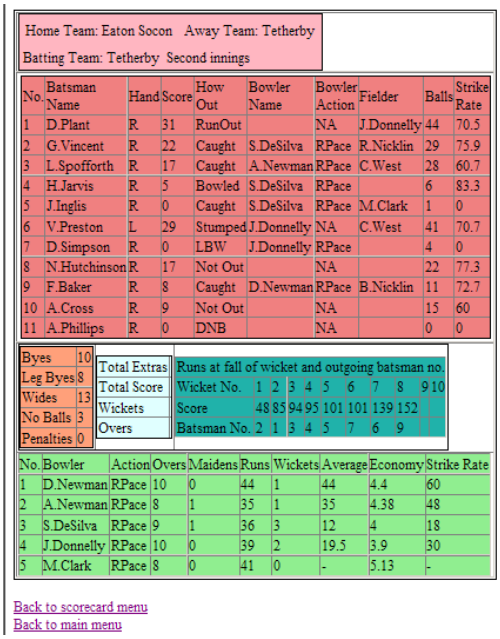
Wicket No.	1	2	3	4	5	6	7	8	9
Score	48	85	94	95	101	101	139	152	
Batsman No.	2	1	3	4	5	7	6	9	

No.	Bowler	Action	Overs	Maidens	Runs	Wickets
1	D.Newman	Right_Arm_Pace	10	0	44	1
2	A.Newman	Right_Arm_Pace	8	1	35	1
3	S.DeSilva	Right_Arm_Pace	9	1	36	3
4	J.Donnelly	Right_Arm_Pace	10	0	39	2
5	M.Clark	Right_Arm_Pace	8	0	41	0
6		Right_Arm_Pace				
7		Right_Arm_Pace				
8		Right_Arm_Pace				
9		Right_Arm_Pace				
10		Right_Arm_Pace				

Submit Scorecard

Cancel scorecard entry

The data from the scorecard above was submitted.



Home Team: Eaton Socon Away Team: Tetherby

Batting Team: Tetherby Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	D.Plant	R	31	RunOut		NA	J.Donnelly	44	70.5
2	G.Vincent	R	22	Caught	S.DeSilva	RPace	R.Nicklin	29	75.9
3	L.Spofforth	R	17	Caught	A.Newman	RPace	C.West	28	60.7
4	H.Jarvis	R	5	Bowled	S.DeSilva	RPace		6	83.3
5	J.Inglis	R	0	Caught	S.DeSilva	RPace	M.Clark	1	0
6	V.Preston	L	29	Stumped	J.Donnelly	NA	C.West	41	70.7
7	D.Simpson	R	0	LBW	J.Donnelly	RPace		4	0
8	N.Hutchinson	R	17	Not Out		NA		22	77.3
9	F.Baker	R	8	Caught	D.Newman	RPace	B.Nicklin	11	72.7
10	A.Cross	R	9	Not Out		NA		15	60
11	A.Phillips	R	0	DNB		NA		0	0

Byes	10
Leg Byes	8
Wides	13
No Balls	3
Penalties	0

Total Extras	
Total Score	
Wickets	
Overs	

Runs at fall of wicket and outgoing batsman no.

Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	48	85	94	95	101	101	139	152		
Batsman No.	2	1	3	4	5	7	6	9		

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	D.Newman	RPace	10	0	44	1	44	4.4	60
2	A.Newman	RPace	8	1	35	1	35	4.38	48
3	S.DeSilva	RPace	9	1	36	3	12	4	18
4	J.Donnelly	RPace	10	0	39	2	19.5	3.9	30
5	M.Clark	RPace	8	0	41	0	-	5.13	-

Back to scorecard menu

Back to main menu

The data from the innings submitted above has been fetched from the database successfully which is proof it has been stored initially in the correct tables.

The system also took a fraction of a time to save all of the data and progress to the next page, so it is safe to say that this objective has been achieved effectively. For further evidence see the client's questionnaire response (section 7.1 question 17), to which the client responds that "this seems to be working effectively". Overall I would conclude that the system has met this objective particularly effectively.

2.3.7 – Data Amalgamation

Objective: Database must compile data from multiple matches into each player's individual record.

Evaluation Criteria:

- Players who have played multiple matches will have a set of statistics conflated from all of their performances available to view.

Judgement and evidence:
This objective has been achieved effectively by the system, as evidenced by the client's questionnaire response. The client was satisfied after using the system to record several matches that the player stats pages functioned correctly and effectively (see section 7.1 question 18). The client tested the system in this regard by entering two matches and viewing the page of a player that had played in both to find that the data from both matches had been combined correctly. This response and my testing section (see Testing section 3.2 test 1.21) lead me to conclude that the system has achieved this objective effectively.

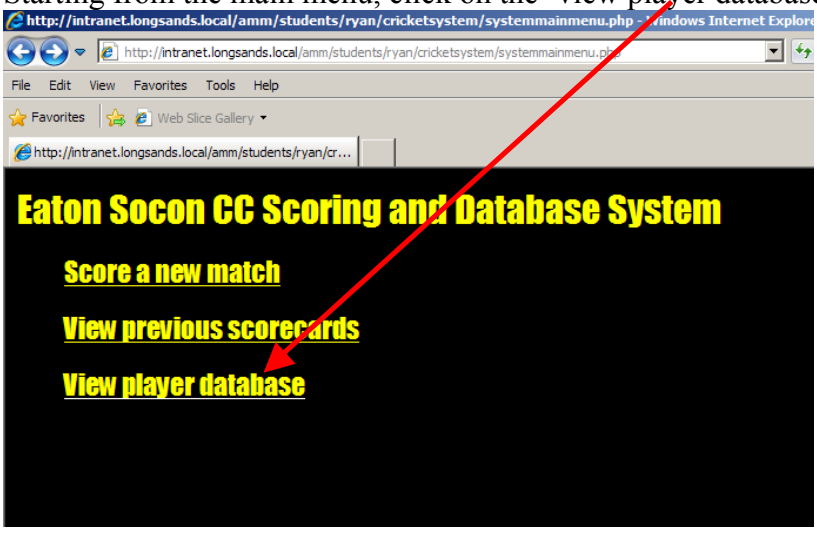
2.3.8 – Player Database Visible

Objective: Database must be visible for the client.

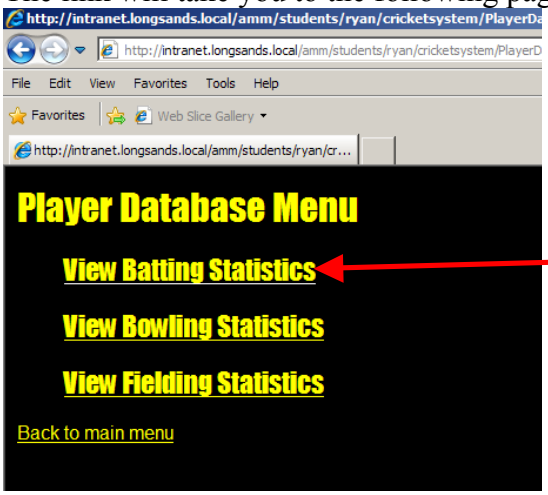
Evaluation Criteria:

- Can the user view a set of statistics involving all of the players on the database?
- Is the database easy to access?
- Are the statistics helpfully organised and set out?

Judgement and evidence:
The system achieved this objective effectively, as evidenced by the user's response to the questionnaire (see section 7.1 question 19) and the screenshots below:
Starting from the main menu, click on the 'view player database' link as shown below:

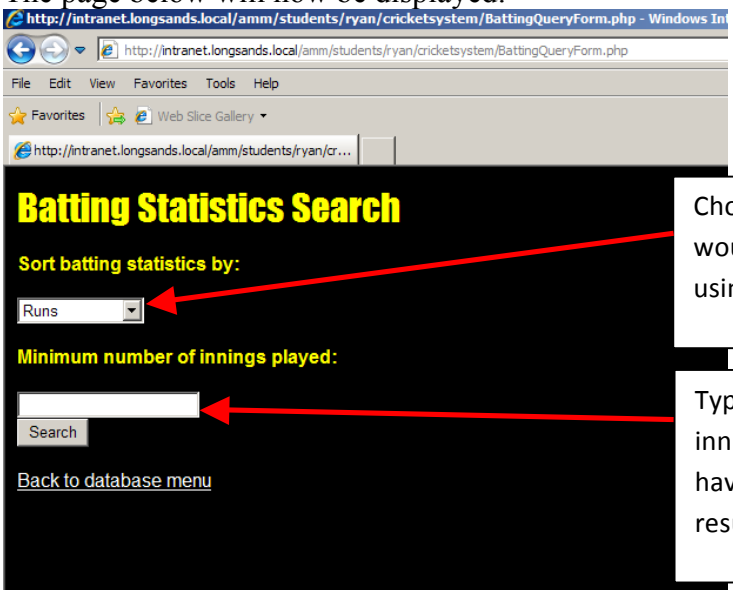


The link will take you to the following page:



Click on the 'View Batting Statistics' link to view the batting statistics section of the system.

The page below will now be displayed:

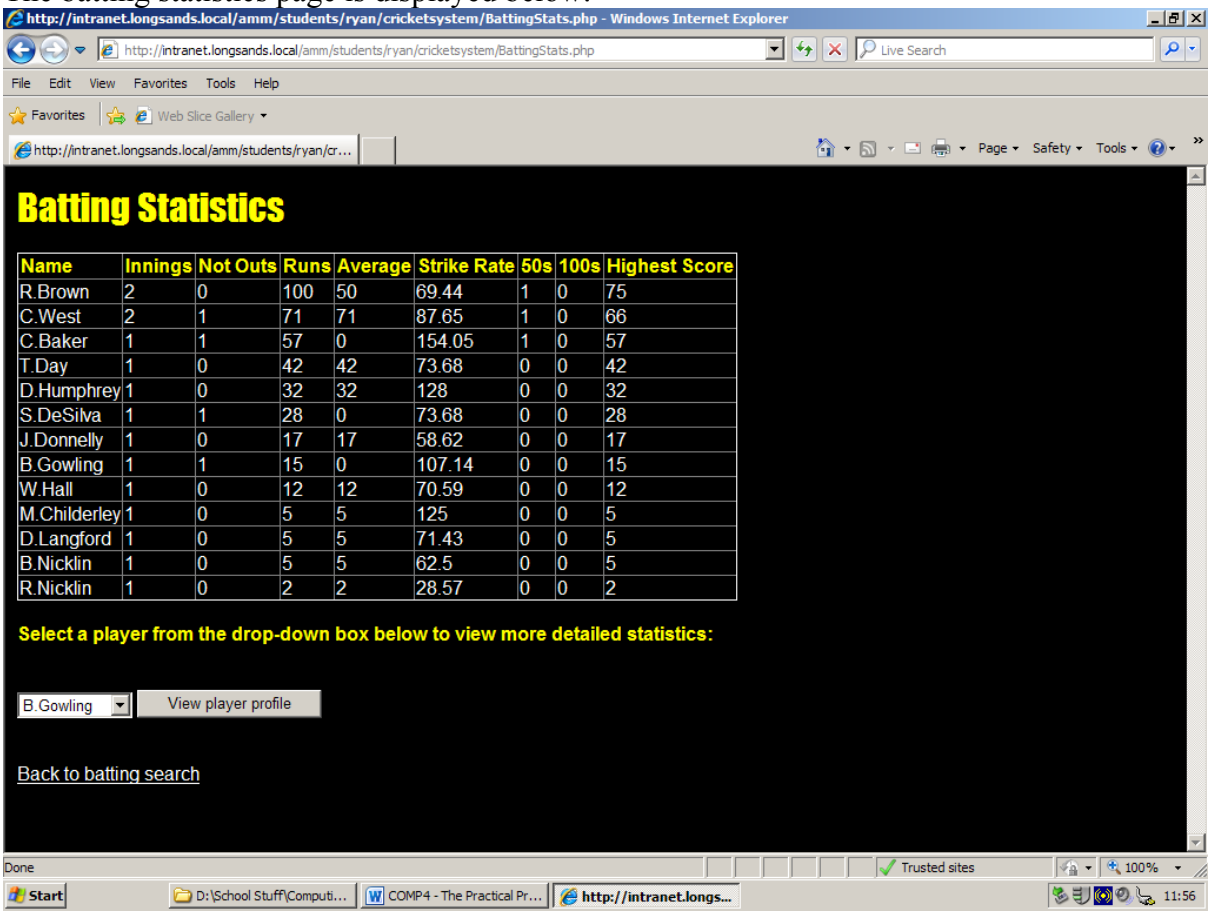


Choose the category by which you would like to sort the results by using the drop down box.

Type in the minimum number of innings required the batsmen must have played to appear in the search results on the next page.

Click on the search button to run the search and progress to the batting statistics page.

The batting statistics page is displayed below:



In response to the questionnaire, the user commented that "I can access the stats parts easily using the menus and search pages", indicating that he was satisified with the effectiveness of this part of the system.

2.3.9 – Pre-set Queries

Objective: Database must be able to run pre-set queries to obtain useful statistics for the client.

Evaluation Criteria:

- Do the queries provide relevant and detailed statistics for the user?
- Can the user adjust the parameters of the query in order to fine tune their result set?

Judgement and evidence:

The system has achieved this objective effectively, as evidenced by the user's response to the questionnaire (see section 7.1 question 20), in which the client noted that "The system fetches all the data I wanted to see on the combined stats lists and being able to sort it by particular categories and add a minimum number of innings to have been played is a useful tool". This shows that the system effectively achieved this objective because they gave the client the power to manipulate the query effectively to return a limited set of results if required with very little complexity.

2.4 – Other Objectives

2.4.1 – Graphical Data Output

Objective: System could present an output page with a compilation of stats from a player and some graphs showing various other statistics.

Evaluation Criteria:

- Can a player stats page be viewed containing data derived from all of the player's performances?
- Are informative graphs provided to help the user further analyse the player's strengths and weaknesses?

Judgement and evidence:

The system has failed to achieve most of this objective to any degree. Although the plater pages are displayed adequately as evidenced in section 2.2.1, the absence of any graphical representation means that the system has failed to effectively solve this objective. See section 7.1 question 21 for further evidence, in which the user explains that as a coach, the graphs are necessary for the client to be able to use the system to attempt to understand the weaknesses of his players.

2.4.2 – Multiple Season Storage

Objective: System could be expanded to store and process data from multiple seasons of matches.

Evaluation Criteria:

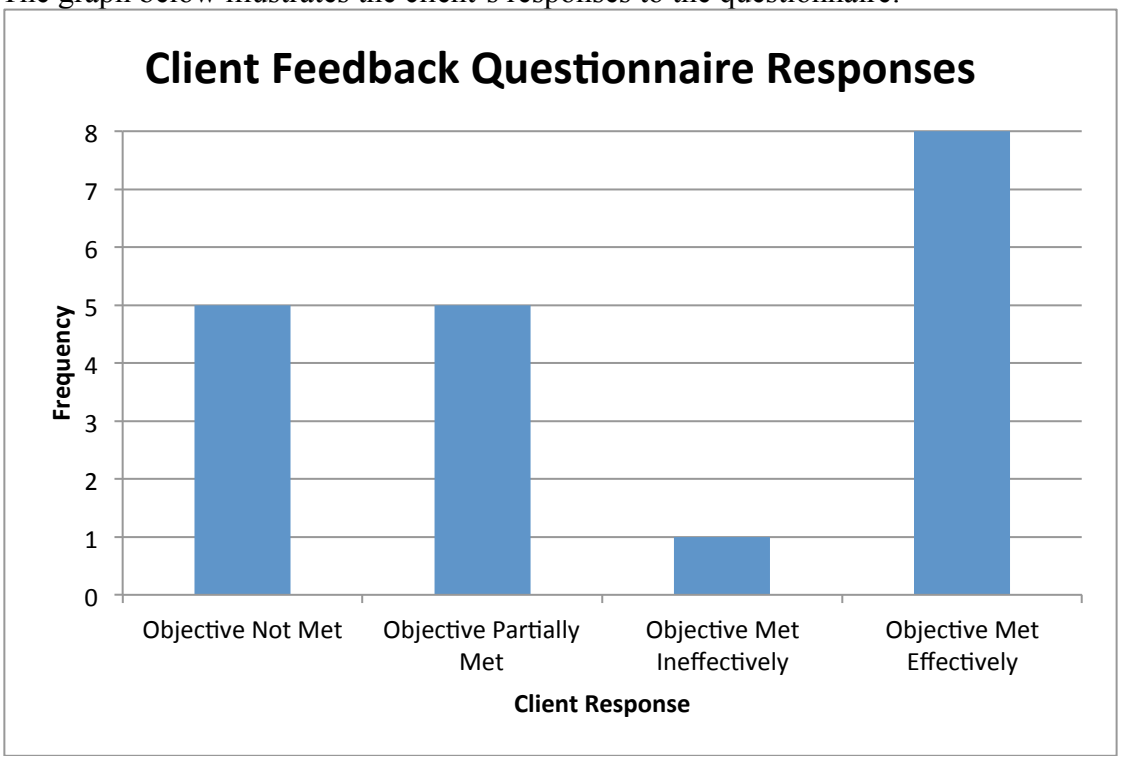
- Can scorecards from more than one year be stored to the database?
- Can the database be queried to provide data from particular seasons?
- On the player page, is the data sorted by season?

Judgement and evaluation:

Although scorecards from more than one year can be stored to the database, the database cannot be queried to return results only from a particular season, nor is the data sorted by season, therefore the system has not effectively achieved this objective. For further evidence, see section 7.1 question 22, in which the user commented that "as it would be helpful in allowing me to see if players are improving season by season".

2.5 – Effectiveness Summary

The graph below illustrates the client's responses to the questionnaire:



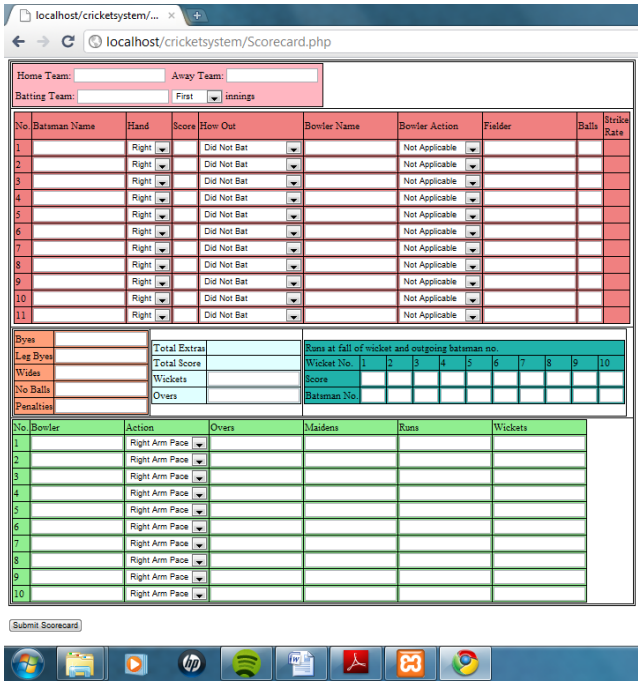
From this graph it can be seen that although (as discussed in section 1.5) many of the objectives have not been met fully, for those that have been met the solution provided is effective in all but one case. Given that the client accepts the failure of the system to achieve several of the original objectives, the system actually provides an effective solution to the problem the client currently faces when compiling statistical records on paper. Therefore I can conclude that the system is effective in its altered guise in achieving two of the three main tasks required of it by the user, those being the storage of match scorecards and the compilation of player data.

3 – Learnability

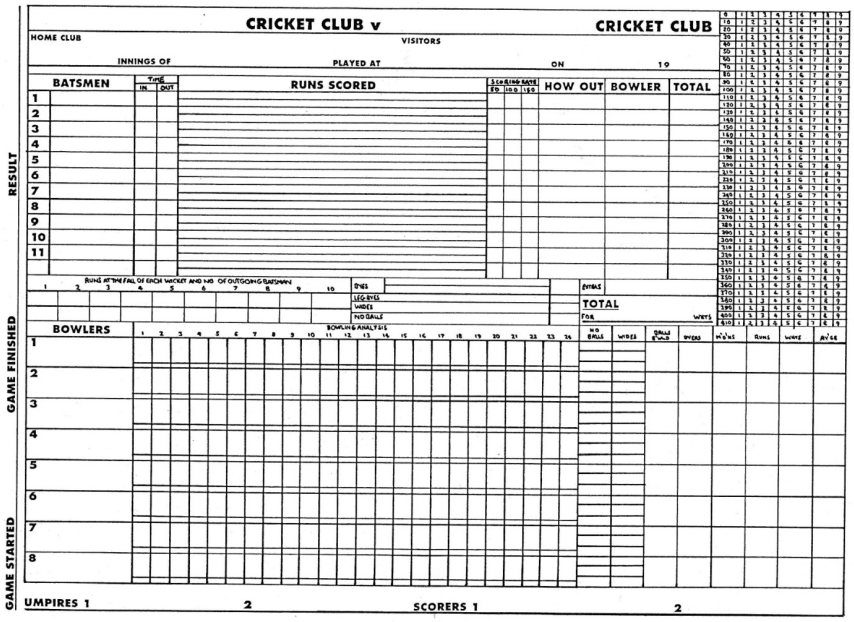
When I first consulted with my client about the possibility of developing the system, I discussed with them the prior knowledge they had so that I could develop the system to be more effective for their needs (See Systems Analysis Section 1). The client has a reasonable knowledge of using computers and is comfortable using the internet. Originally, the idea was that someone with only limited computer knowledge would be able to use the scoring part of the system, but after removing the ball-by-ball processing features the need to keep the system incredibly basic was removed to some extent because now only the client woul be using the system. The client also has a complete knowledge of the traditional method of scoring cricket matches using special purpose paper sheets.

With this in mind I took the following steps when designing the system:

Firstly, I ensured that the user would be familiar with the layout of the scorecard section of the system by mirroring the design of a traditional scoresheet as closely as possible (see screenshots below).

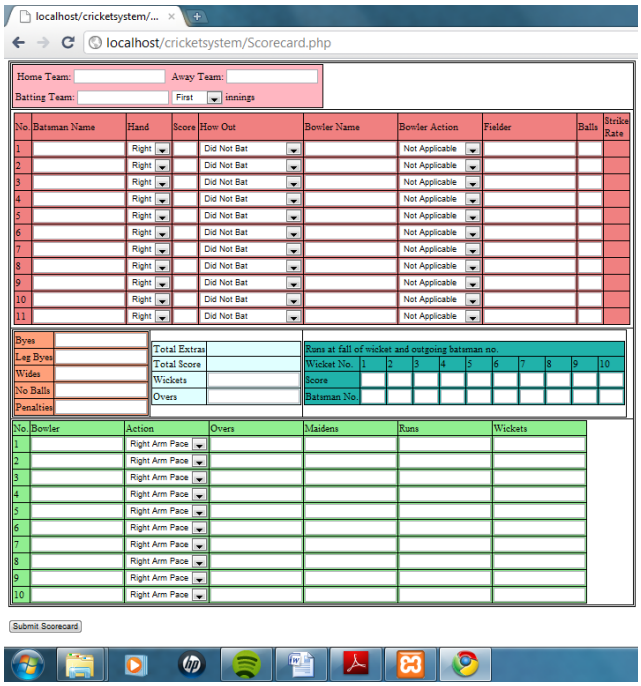


This scorecard is similarly formatted to the traditional paper scorecard shown underneath.



This has proved effective in allowing the user to understand the scorecard very easily as evidenced by the client's response to my questionnaire (see section 7.1, question 7), in which they recognised the similarity of the design to the traditional scorecard and confirmed that this helped to make it easy to use, suggesting a high level of learnability.

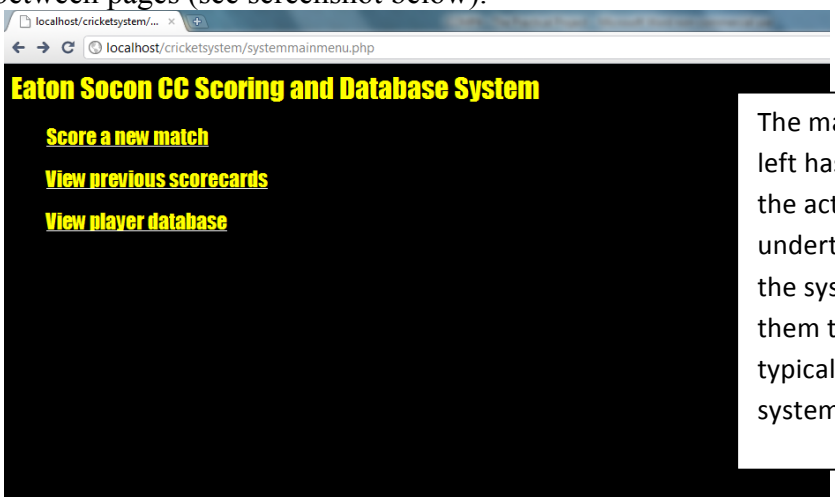
Secondly, I have designed my system using elements of web design which the client is already familiar with, particularly in the case of the forms in my system, as evidenced by the screenshots below.



I have used text fields, drop down menus and a submit button like the majority of web based forms commonly found on the internet.

In the case of the scorecard, this has proved effective in allowing the user to adapt to using the system quite easily.

In the other areas of my system, I have attempted again to use a format similar to web pages whenever possible, for example, my menus use mostly carefully labelled hyperlinks to move between pages (see screenshot below).



The main menu page shown on the left has hyperlinks which describe the activities the user may want to undertake and link to the area of the system where it is possible for them to achieve their task. This is typical of the menu pages of my system

The success of this method in allowing the client to use the system easily is evidenced by their response to the questionnaire (see section 7.1, questions 1 and 2), to which they answered that in general the system's interface was "quite simple" and that "the links and buttons are helpfully labelled", which are both important in assessing the learnability of the system.

Overall, I would argue that due to the design features explained above and the client's generally poisitive feedback about the quality of the user interface, the system has a very gradual learning curve, especially for a user like my client who has a reasonably solid knowledge of using computers and the internet in particular. However, it might prove a little more complex for somebody with a very basic knowledge of computer usage and completely

incomprehensible for somebody without the requisite knowledge of cricket. For my client, though, it is a solution with a very acceptable learning curve.

4 – Usability

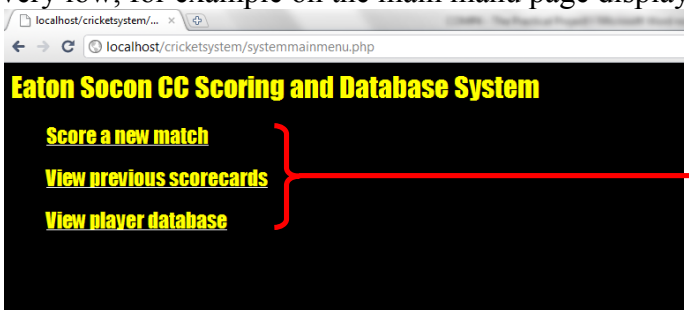
In this section I will assess how easy my system is to use, with particular emphasis on the effectiveness of the user interface. This will be achieved by measuring the system against several criteria, which are listed below:

- Target acquisition time
- Latency
- Readability
- Use of metaphors
- Navigability

The system's performance in these areas should allow us to evaluate whether or not it has a good level of usability or not.

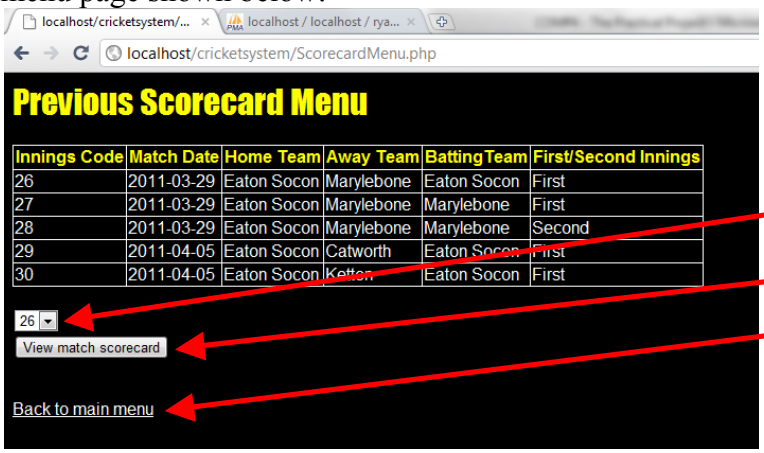
4.1 – Target Acquisition Time

In general when navigating the menu structure of the system, the target acquisition time is very low, for example on the main manu page displayed below:



Low target acquisition time has been achieved by using large font for the hyperlinks on the menu.

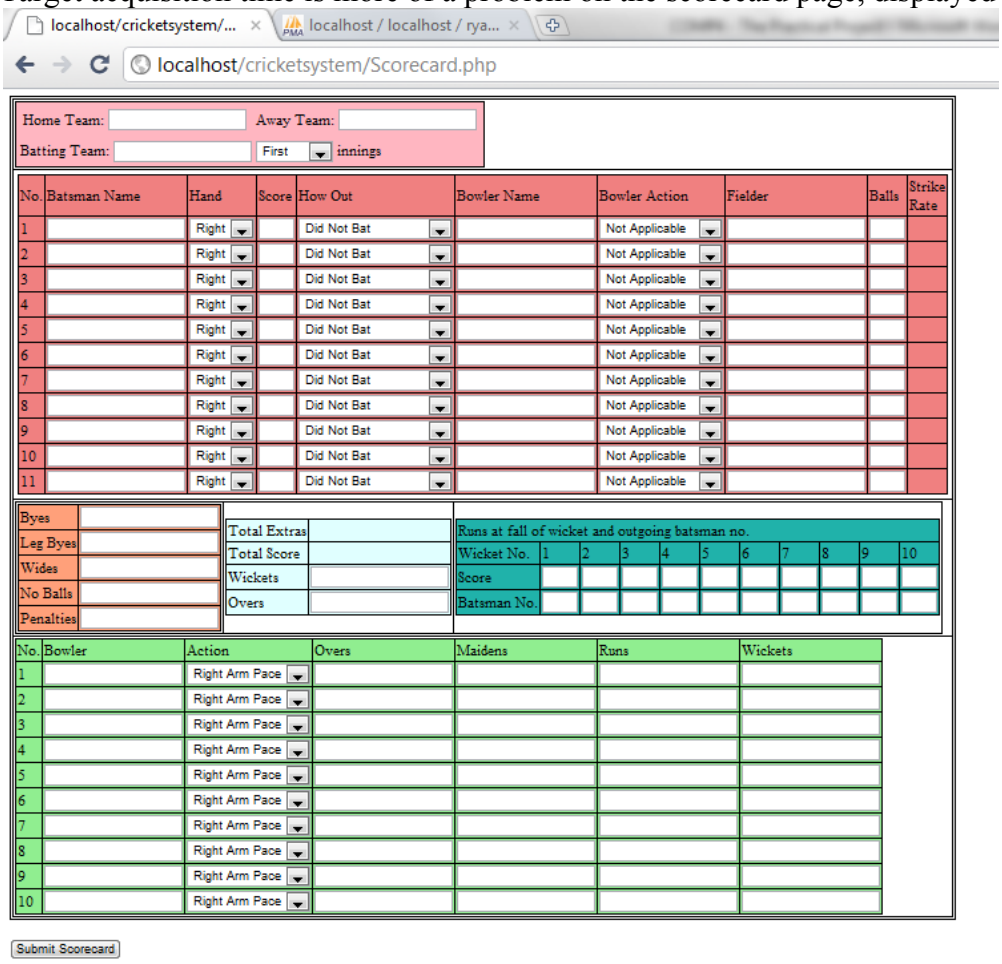
However, some pages have a slightly slower target acquisition time, such as the scorecard menu page shown below:



Compared to the main menu page, the link back to the main menu and the view match scorecard button are relatively small. The button to open the drop down menu in particular has a high acquisition time.

However, I would say that the target acquisition time on this page is not unreasonable. In general, the client also expressed satisfaction with the ease of use of the system's interface, responding to the questionnaire (see section 7.1, question 1) that the system has provided an effective and simple interface for the user with the exception of the scorecard page, which is dealt with below.

Target acquisition time is more of a problem on the scorecard page, displayed below:



The text entry boxes and drop down menus are all quite close together which makes them slow to move to as the user has to be quite precise with their movements of the cursor.

Added time is taken by the need to either scroll down the page or zoom out to access the submit scorecard button at the bottom of the page.

The client has also acknowledged this point, commenting in his response to the questionnaire (see section 7.1, question 1) that the scorecard is "time consuming" to fill in. Therefore, while the rest of the system has good levels of target acquisition time, its overall usability is decreased somewhat by the high target acquisition time of the scorecard.

4.2 – Latency

Latency is not really an issue in the system. On all of the three machines I have so far used the system on, all the tasks carried out by the system have occurred almost instantaneously. The customer did not note any dissatisfaction with the system in this regard in his responses to the questionnaire (see section 7.1).

4.3 – Readability

In general, the readability of my pages is very good. This is because most of the pages on the system follow the club's colour scheme, which conveniently is black, yellow and white. I

have also checked that the text is large enough to be easily readable on several monitors and internet browsers. For example, see the screenshot of the batting stats page below:

Page headings, table headings and general texts are displayed in yellow which provides excellent contrast against the black background.

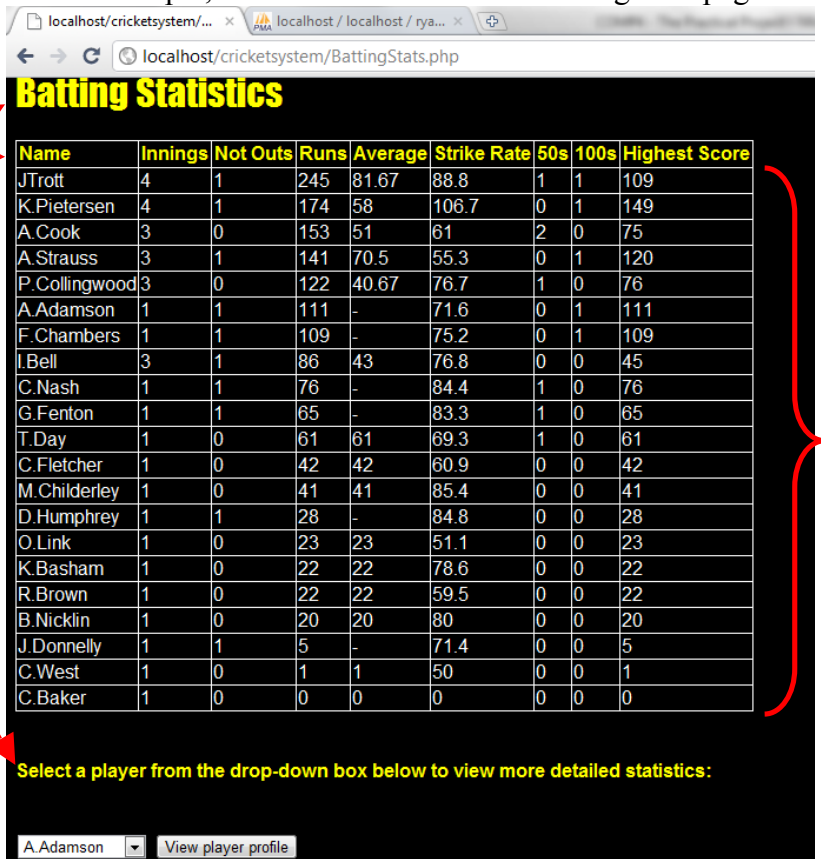
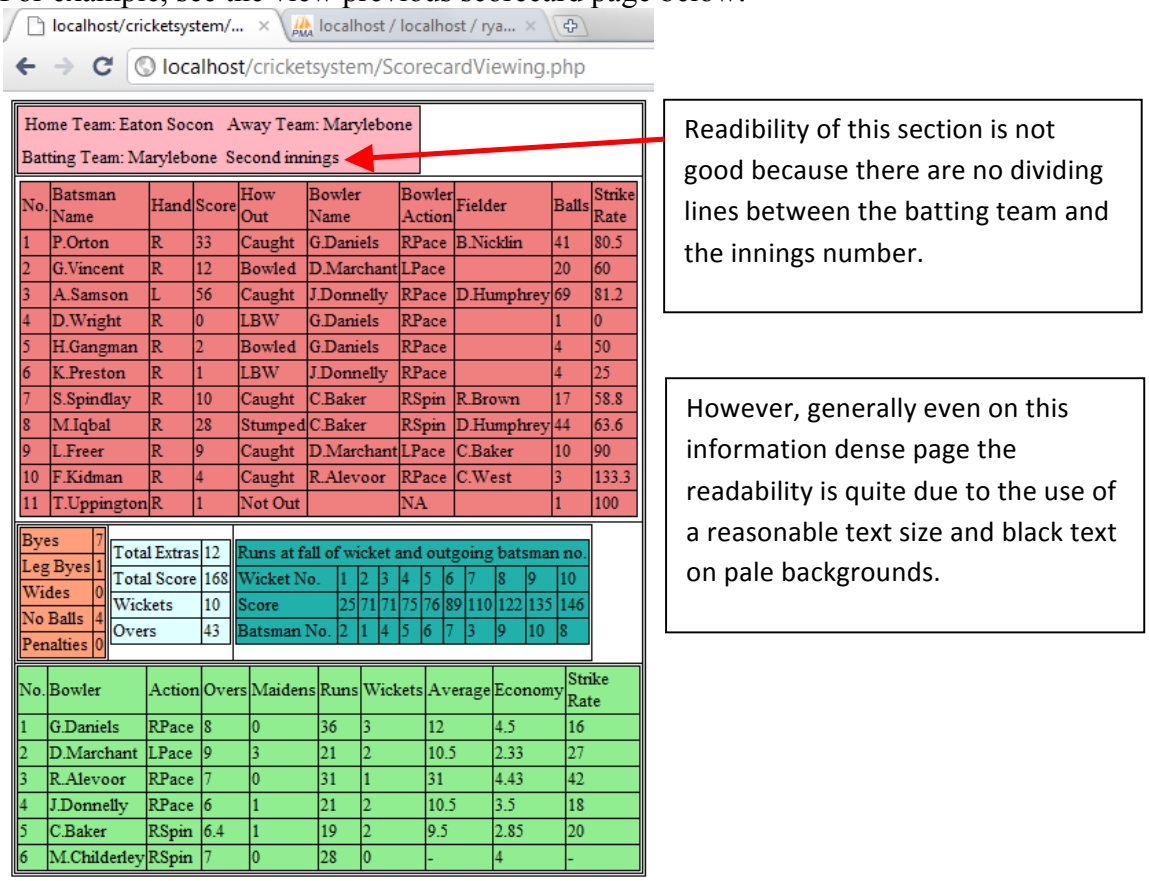


Table borders and contents are also displayed in white and the text is large enough to be easily legible. Again, white provides an excellent contrast against the black background.

Readability is more of an issue on the scorecard pages (see next page).

For example, see the view previous scorecard page below:



localhost/cricketsystem/... | localhost / localhost / rya...

localhost/cricketsystem/ScorecardViewing.php

Home Team: Eaton Socon Away Team: Marylebone

Batting Team: Marylebone Second innings

No.	Batsman Name	Hand	Score	How Out	Bowler Name	Bowler Action	Fielder	Balls	Strike Rate
1	P.Orton	R	33	Caught	G.Daniels	RPace	B.Nicklin	41	80.5
2	G.Vincent	R	12	Bowled	D.Marchant	LPace		20	60
3	A.Samson	L	56	Caught	J.Donnelly	RPace	D.Humphrey	69	81.2
4	D.Wright	R	0	LBW	G.Daniels	RPace		1	0
5	H.Gangman	R	2	Bowled	G.Daniels	RPace		4	50
6	K.Preston	R	1	LBW	J.Donnelly	RPace		4	25
7	S.Spindlay	R	10	Caught	C.Baker	RSpin	R.Brown	17	58.8
8	M.Iqbal	R	28	Stumped	C.Baker	RSpin	D.Humphrey	44	63.6
9	L.Freer	R	9	Caught	D.Marchant	LPace	C.Baker	10	90
10	F.Kidman	R	4	Caught	R.Alevoor	RPace	C.West	3	133.3
11	T.Uppington	R	1	Not Out		NA		1	100

Byes	7
Leg Byes	1
Wides	0
No Balls	4
Penalties	0

Total Extras	12
Total Score	168
Wickets	10
Overs	43

Runs at fall of wicket and outgoing batsman no.										
Wicket No.	1	2	3	4	5	6	7	8	9	10
Score	25	71	71	75	76	89	110	122	135	146
Batsman No.	2	1	4	5	6	7	3	9	10	8

No.	Bowler	Action	Overs	Maidens	Runs	Wickets	Average	Economy	Strike Rate
1	G.Daniels	RPace	8	0	36	3	12	4.5	16
2	D.Marchant	LPace	9	3	21	2	10.5	2.33	27
3	R.Alevoor	RPace	7	0	31	1	31	4.43	42
4	J.Donnelly	RPace	6	1	21	2	10.5	3.5	18
5	C.Baker	RSpin	6.4	1	19	2	9.5	2.85	20
6	M.Childerley	RSpin	7	0	28	0	-	4	-

Back to scorecard menu

Back to main menu

Readibility of this section is not good because there are no dividing lines between the batting team and the innings number.

However, generally even on this information dense page the readability is quite due to the use of a reasonable text size and black text on pale backgrounds.

It is worth noting that my client, although short-sighted, uses glasses or contact lenses when using the computer and is the only person expected to use the system as the ball by ball match processing element is not present. The client has not expressed any dissatisfaction with the system in this regard in his responses to the questionnaire (see section 7.1) and in fact when compared with a traditional paper scorecard this system is considerably more readable. Therefore there is no reason to suspect that the readablility of the system in any way limits its usability.

4.4 – Use of Metaphors

I have not made any use of metaphors in my system. Hopefully the textual descriptions of each button/link should allow the user to understand its function. Admittedly, upon first use it would take the user a short amount of time to read each link's description, but I don't believe the absence of metaphors will seriously impact on the usability of the system. This theory is supported by the user response to question 2 of the questionnaire (see section 7.1) in which he comments that "the links and button are helpfully labelled".

4.5 – Navigability

My testing programme (see Testing section, test series 1) and user feedback suggests (see section 7.1 question 2) that my system has a high level of navigability. The system passed all of the user interface navigability tests with flying colours (see Testing section 3.2 test series 1), whilst the user responded to question 2 of the questionnaire that "the menu structure works well and most of the links and buttons are self explanatory and helpfully labelled". The links and buttons used to navigate the system are indeed carefully labelled and the menu

structure has been designed so that there is always a means to move back to the system main menu or the previous page using very few clicks. I have also provided some links to act as shortcuts not immediately next to the page in question in the system structure.

However, there are two quite frustrating instances which impinge on the system's overall navigability.

Firstly, if an error is found in a scorecard after it has been submitted, there are no means to return to the scorecard and adjust the data if it has already escaped the validation. However, this is more of an issue with the validation than the actual navigability of the system and will hopefully be avoided if the user fills the scorecard out accurately.

Secondly, when at the player stats page, there is no means to return to the previous stats page that the player was selected from in the system, meaning that the user has to run the query again if they want to reach the previous page they were on. However, the user can utilise the back button in Google Chrome to return to the previous page.

Therefore, there is no reason to suggest that the navigability of the system has any negative impact on its usability.

4.6 – Summary

In general, I think that the system has achieved a good level of usability. The particular strengths of the system in this regard are its excellent readability and quick level of latency. Although target acquisition time is longer than might be desired on some pages and there is an absence of metaphors on the system, I don't think the usability of the system is seriously impinged. However, the two navigability limitations referred to in section 6.4, particularly regarding the scorecard inflexibility, do limit the system's usability to some extent. For the most part though, the system should not prove difficult for my client to utilise.

5 – Maintainability

5.1 – Fixing Bugs

It should prove relatively easy to fix any bugs in my system. Although my testing programme did not reveal any bugs as such in the system, should any materialise it should be relatively possible to fix them for the following reasons:

- The code is largely self-documented and therefore it should be relatively easy for the maintainer to identify and therefore fix problems in the code (see System Maintenance section 10).
- Much of the statistical data is calculated in procedures with good use of parameters and local variables, which should allow any bugs to do with these statistical calculations to be isolated and fixed relatively easily (see System Maintenance section 10.14).
- Any complicated sections of code are commented to enable the maintainer to understand the code which will aid in the fixing of bugs (see System Maintenance section 10).
- Further documentation is provided in the System Maintenance section which contains further code explanations (see System Maintenance section 7) and explanations of the sql queries (see System Maintenance section 5) and algorithms (see System

Maintenance section 7.2) which again should help the maintainer to understand the code and therefore fix most errors fairly easily.

5.2 – Changing Parameters

I cannot foresee a situation in which the parameters in the system would need to be changed as the rules of cricket are rather well established, as are the definitions of how to calculate batting and bowling averages, strike rates etc., although there might be circumstances in which the sql connection statements need alteration. However, should such a change be required, it should be relatively straightforward to enact such a change for the following reasons:

- The system makes use of procedures which use local variables and parameters so only the parameter will need changing rather than large sections of code (see System Maintenance section 10.14).
- The code is well commented so the user can understand the function of particular procedures, variables and parameters which will enable them to be edited easily(see System Maintenance section 10).
- There is copious documentation provided in the system maintenance section to further explain the purpose of each procedure, variable and parameter in the system, again making it simple to alter the system as required.

5.3 – Responding to New Requirements

Whether or not the system will prove easy to adapt to new requirements depends essentially very much on the nature of the update required. For example, should it be necessary to add new fields to the scorecard, this might prove quite difficult to implement effectively due to the design of the scorecard being very specific according to the data required by the user. A summary of how easy it should be to adapt the system to new requirements is provided below:

- The software is not completely modular. Although procedures have been used where possible in some areas much of the code exists in full on each page rather than being called from a different file. This may make it more complex to alter the system as the code is not broken down into as small sections as might have been ideal to allow for easy maintainability (see System Maintenance section 10).
- The code is largely self-documenting. Variable names have been selected carefully and consistent indentation has been used throughout which makes the code quite easy to read which will aid in the identification of areas which need altering by the programmer (see System Maintenance section 10).
- The procedures can be updated relatively easy because they make use of parameters and local variables to keep them as self contained as possible which allows them to be edited once only rather than having to edit multiple parts of the system(see System Maintenance section 10.14).
- I have not made as much use of local variables as perhaps I should have done during the implementation of my system. Although, it has not led to any errors that I know of, this may have made it slightly more difficult for the maintainer to edit the system as they may make a mistake when editing variable names and call variables in the wrong places.
- The code is thoroughly commented which should aid the programmer in altering the code as they will be able to understand each section easily (see System Maintenance section 10).

- Thorough documentation of the system has been provided in the system maintenance section which should allow the maintainer to easily understand, among other things, the function of each part of the code, the purpose of all procedures, the algorithms used in my system, the SQL queries I have designed for the system, the relationships between the entities in my database, the movement of data throughout the system and the movement of the user around the system.
- I included stubs of unfinished code (see System Maintenance section 10.17) which may provide a basis for the programmer to enact some of the updates to the system suggested below in section 6.1.

5.4 – Summary of Maintainability

Overall, I would argue that the system has a good level of maintainability. Due to the well documented and commented code, it should prove easy to understand all section of the system and amend them as necessary. This should allow for especially straightforward fixing of bugs and changing of parameters. Although there are some possible problems which might occur when adapting the system to new requirements, largely because the code is not perfectly modular, the exhaustive documentation available should allow the programmer to circumvent these possible issues.

6 – Suggestions for Improvement

The client highlighted several shortcomings and possible areas for development which they would like to see improved in future editions of the system. The most important and desirable are listed and explained in this section.

6.1 – Ball-by-ball Match Processsing

Obviously most of the initial objectives for the system were devised with the idea of having a system which would enable the ball by ball processing of matches. Whilst I have discussed with the client the reasons for altering the system and he accepts them, he has made it clear that it would make the system far more effective if this were possible to be implemented in the future. This is most apparent in his responses to questions 3, 5, 10, 13 and 14.

6.2 – More Effective Validation and Prompts

The client made it clear in his response to question 4 that the validation currently in place is not sufficient to prevent serious inaccuracies in the submission of data. He also suggested that he would be keen to have the system display possible players he could be entering which are already present in the database which would help to avoid data inaccuracies due to typing errors in the names.

6.3 – Graphical Data Output

Whilst not an immediate priority, the client made it clear in his response to question 21 that it would be extremely helpful to him as a coach to have graphs available to aid in the analysis of his players. He suggested graphs regarding which bowler types players get out to most often, and what methods each player is dismissed by commonly when batting.

6.4 – Multiple Season Storage

The client suggested in his response to question 22 that this would be a helpful tool in order to see whether players are improving from season to season and therefore this would be a worthwhile update to make to the system.

7 – End User Evidence Appendix

7.1 – Questionnaire

For each question, I invited the client to provide a resonse by circling a number from 0 to 3. The key for this is shown below:

0 – System has completely failed to meet the objective.
1 – System has only partially met the objective.
2 – The system has met the objective but the solution is not effective or is difficult to use.
3 – The system has completely fulfilled the objective.

I also asked the client to provide further comment on each question if necessary, which has been included in the results transcript below.

N.B. I have discussed with the client on several occasions the reasons for changing from ball-by-ball processing to the revised system and although obviously they were disappointed that I was unable to deliver the ideal system they have accepted my reasons for making the change and are willing to accept the revised system which still enables the user to complete the task of compiling statistics easily. Some of the questions have been left without comment for this reason, as the objective no longer really applies to the system.

1. To what extent would you agree that the system has fulfilled the objective of having an easy to use interface so that inexperienced computer users can manage with little training?

Score: 2
Comment: The main scorecard parts look very similar to a paper scorecard so I had no problem using it, apart from the fact the match entry one is really quite time consuming to fill in. The rest of it was quite simple as well so I'd say the interface is not bad overall.

2. To what extent would you agree that the system has fulfilled the objective of having a straightforward menu structure with useful and informative prompts?

Score: 3
Comment: The menu structure works well and most of the links and buttons are self explanatory and helpfully labelled.

3. To what extent would you agree that the system has fulfilled the objective of reducing human error as much as possible by having most processes undertaken by computer?

Score: 0

4. To what extent would you agree that the system has fulfilled the objective of having sufficient validation to prevent as many mistakes as possible?

Score: 1

Comment: It's helpful in preventing me from forgetting to fill out parts of the form, but to be really useful it needs to provide suggestions from the database when filling in names to prevent me from storing a different player due to making a typo when entering the name. Also needs something to stop me putting huge numbers in by accident.

5. To what extent would you agree that the system has fulfilled the objective of being fast to use so that data can be recorded between balls?
Score: 0

6. To what extent would you agree that the system has fulfilled the objective of allowing the user to view a well set out page of statistics for each player on record?
Score: 3
Comment: The player pages are ideal, although they'd be even better with some graphs.

7. To what extent would you agree that the system has fulfilled the objective of having a score sheet which is simple and clear but informative?
Score: 3
Comment: More informative than the paper scoresheets I'm using at the moment. Similar to them in its layout as well, so it's ideal.

8. To what extent would you agree that the system has fulfilled the objective of having a score sheet which contains details of: player names; team names; batsmen's scores; dismissal methods; bowler's figures; extras conceded; run rates; strike rates; economy rates.
Score: 1
Comment: Contains almost all the data I said I needed in our very first meeting except innings run rates.

9. To what extent would you agree that the system has fulfilled the objective of having player records which store details of games played, total runs, total innings, not outs, batting average, 50's, 100's, strike rate, ducks, run ranges, dismissal methods, overs bowled, wickets taken, runs conceded, maidens bowled, bowling average, five wicket hauls, economy rate, best bowling, strike rate, catches taken and run-outs effected?
Score: 1
Comment: Provides all the data I asked for except ducks and run ranges.

10. To what extent would you agree that the system has fulfilled the objective of allowing the user to record the result of each ball with one key press and a confirmation key press; except for in exceptional circumstances e.g. wickets, extras?
Score: 0

11. To what extent would you agree that the system has fulfilled the objective of processing data to calculate run rates, economy rates and strike rates?
Score: 3
Comment: All seems to work well.

12. To what extent would you agree that the system has fulfilled the objective of being able to keep score of matches using input from a scorer?

Score: 0

13. To what extent would you agree that the system has fulfilled the objective of calculating player scores, extras and total team scores?
Score: 1
Comment: As we discussed it doesn't calculate the player scores anymore. The total extras and total score are calculated properly though.

14. To what extent would you agree that the system has fulfilled the objective of calculating bowling figures?
Score: 0

15. To what extent would you agree that the system has fulfilled the objective of having the ability to store a minimum of 60 score sheets?
Score: ? – must be checked in further consultations with client.
Comment: Haven't had the need to fill in this many yet.

16. To what extent would you agree that the system has fulfilled the objective of storing data for a minimum of 30 players?
Score: ? – must be checked in further consultation with client.
Comment: Haven't entered that many players yet.

17. To what extent would you agree that the system has fulfilled the objective of automatically transferring data from scoresheet component to database component?
Score: 3
Comment: I haven't found any problems with viewing the previous scorecards or the accuracy of the player stats so this seems to be working effectively.

18. To what extent would you agree that the system has fulfilled the objective of having compiling data from multiple matches into each player's individual record?
Score: 3
Comment: Having entered a couple of matches and looked at the profile of a player who has played more than once it seems to be working fine.

19. To what extent would you agree that the system has fulfilled the objective of having a database which is visible for the client?
Score: 3
Comment: I can access the stats parts easily using the menus and search pages.

20. To what extent would you agree that the system has fulfilled the objective of having the ability to run pre-set queries to obtain useful statistics for the client?
Score: 3
Comment: The system fetches all the data I wanted to see on the combined stats lists and being able to sort it by particular categories and add a minimum number of innings to have been played is a useful tool.

21. To what extent would you agree that the system has fulfilled the objective of having an output page with a compilation of stats from a player and some graphs showing various other statistics?
Score: 1

Comment: As I said before, the player pages are good, but they would have been improved by some graphs. As a coach, it would be really helpful to have graphs showing which type of bowler or which method batsmen are dismissed by most often in order to be able to analyse weaknesses in their game.

22. To what extent would you agree that the system has fulfilled the objective of having the ability to store and process data from multiple seasons of matches?
Score: ? – user hasn't had a chance to evaluate this yet.
Comment: Obviously I haven't used the system across multiple seasons, but you've told me there isn't yet a way to view stats from different seasons separately. Perhaps its something we could look into in the future as it would be helpful in allowing me to see if players are improving season by season.

7.2 – Graphs

Below is a graphical representation of the client's responses to the questionnaire in section 7.1 . Note that there are only nineteen values present in the graph because the client had not had time to evaluate three of the system objectives before responding to the questionnaire.