Heuristic Analysis: AIND - Isolation

In the game of isolation there are basically three strategies: first keep your own moves maximum, second make opponent moves minimum, and third Block opponent's move if possible. Thus, any admissible heuristic function needs to take into account these three strategies. I have defined three functions:

1. Total number of moves possible for the player
2. Total number of moves possible for the opponent
3. Total number of common moves between player and opponent

Any admissible Heuristic Function is a linear (or nonlinear) combination of the three: . To measure the performance of the heuristics the agent plays match against seven other agents. Table below lists the performance of the three heuristics I have considered vis a vis its match against 7 different agents

S.No.	Match against	Heuristic 1		Heuristic 2		Heuristic 3	
		Student	Improved_ID	Student	Improved_ID	Student	Improved_ID
1	Random	19 to 1	15 to 5	18 to 2	20 to 0	19 to 1	19 to 1
2	MM_Null	17 to 3	16 to 4	18 to 2	18 to 2	19 to 1	17 to 3
3	MM_Open	16 to 4	16 to 4	14 to 6	17 to 3	14 to 6	14 to 6
4	MM_Improved	17 to 3	14 to 6	11 to 9	14 to 6	13 to 7	10 to 10
5	AB_Null	17 to 3	16 to 4	18 to 2	14 to 6	18 to 2	17 to 3
6	AB_Open	12 to 8	15 to 5	14 to 6	13 to 7	15 to 5	16 to 4
7	AB_Improved	13 to 7	12 to 8	13 to 7	13 to 7	15 to 5	11 to 9
Total		79.29%	74.29%	75.71%	77.86%	80.71%	74.29%

Conclusion:

We can see that the modifications in Heuristics affect the performance of the Custom Player. In the three cases shown above, while the Improved_ID, which is based on the heuristics () wins roughly 74% times when it plays against the seven different agents. The first and third heuristic functions are better in terms of performance, with third heuristic best among three. The third heuristics gives the best performance.
The third heuristic function has following characteristics:

1. It divides the weightage (1=0.7+0.1+0.2) among three strategies, with highest weight to “having large number of moves, f_1”.
2. The student agent performed better than the Improved_ID agent when both played against MM_Improved, which uses the same heuristics as ID_improved.
3. Student Agent with third heuristics has performed better or equal to Improved_ID agent when playing against all the different seven agents.