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Analysis of Variances for Variables Selection in Secure SDLC

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ABSTRACT

Software security is a fundamental requirement for software frameworks. Notwithstanding, late investigation indicates that numerous software development systems don't unequivocally include strategies for incorporating information security into the software development life cycles (SDLC).In this paper a research survey is carried out using a well-structured questionnaire to understand whether the variables considered for the study are significant or not, ANOVA Test has been deployed and results have proved that variables considered are highly significant.

***Keywords:**- Software development life cycles (SDLC), software frameworks, Software security*

INTRODUCTION

Despite the fact that product improvement industry spends the greater part of its financial limit on programming testing and support related exercises [1]; programming testing has gotten little consideration in our exploration field. This recommends most programming analyzers are then either self-educated or they procure required aptitudes hands on maybe through formal and casual instruments utilized generally in the business. Absence of appropriate consideration in getting testing aptitudes is bringing about less use of test assets and in this way brings about less test productivity of association. With this examination we are focusing on a way to deal with set up a procedure that is financially savvy and productive to meet the product business pressure for conveying successful and ease programming. Estimation is a key component of a powerful and productive programming testing process as it assesses the quality and viability of the procedure.

REVIEW OF LITERATURE

Green and Smith talked about how research addressing the human variables of software security is commonly lacking, what's more, that designers are regularly seen as \the most vulnerable link"|mirroring the early disposition towards end-clients previously usable security look into gained prominence. While designers are more in fact experienced than average end-clients, they ought not be confused with security specialists. They need bolster when dealing with security undertakings, e.g., through designer well-disposed security instruments or programming dialects that forestall security blunders. To this end, Acar et al. outlined an exploration motivation towards understanding engineers' mentalities and security knowledge, exploring the convenience of accessible security development apparatuses, what's more, proposing instruments and procedures to help designers in building secure applications.

We currently talk about pertinent inquire about addressing such human parts of software security. For the most part, contemplates around there face difficulties in recruiting designers and ensuring naturally legitimacy. Designers are occupied and should frequently agree to authoritative limitations on what can be shared freely. To mostly address these issues, Stransky et al. structured a stage to encourage dispersed online programming contemplates with engineers.

RESEARCH METHODOLOGY

Research Instrument: Questionnaire
Sample Size considered: 253
Rejected sample: 20
Type of Respondents: Software Engineers from SME's in Bengaluru
Duration of data Collection 6 Months
Tools used: IBM SPSS
Statistical Tests Applied: Cronbach alpha test, ANOVA, Regression and correlation.

RESULTS & DISCUSSIONS

Table 1:- *ANOVA*

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Total experience (in years)	Between Groups	352.628	3	117.543	2113.810	.000
	Within Groups	13.846	249	.056		
	Total	366.474	252			
Specify your Role in the software team	Between Groups	189.631	3	63.210	363.749	.000
	Within Groups	43.270	249	.174		
	Total	232.901	252			
Specify your experience only in one particular project at a time	Between Groups	477.263	3	159.088	217.264	.000
	Within Groups	182.326	249	.732		
	Total	659.589	252			
As per your experience rate various reasons due to which the possibility of bug arrival you have encountered, (Rate the from 1 to 5 where 1 is the least possibility and 5 expresses the maximum possibility) - Number of developers	Between Groups	8.539	3	2.846	5.448	.001
	Within Groups	130.094	249	.522		
	Total	138.632	252			
Depth of inheritance(DIT)	Between Groups	114.219	3	38.073	43.144	.000
	Within Groups	219.734	249	.882		
	Total	333.953	252			
Weighted methods per class (WMC)	Between Groups	118.384	3	39.461	33.886	.000
	Within Groups	289.971	249	1.165		
	Total	408.356	252			
Code complexity(Complexity)	Between Groups	168.798	3	56.266	152.731	.000
	Within Groups	91.731	249	.368		
	Total	260.530	252			
Coupling between objects (CBO)	Between Groups	35.937	3	11.979	10.660	.000
	Within Groups	279.810	249	1.124		
	Total	315.747	252			
Change in code	Between Groups	94.631	3	31.544	28.628	.000
	Within Groups	274.357	249	1.102		
	Total	368.988	252			
File or Class size (LoC)	Between Groups	27.662	3	9.221	15.657	.000
	Within Groups	146.639	249	.589		
	Total	174.300	252			
Lack of Cohesion of Methods (LCOM)	Between Groups	37.954	3	12.651	17.989	.000
	Within Groups	175.121	249	.703		

	Total	213.075	252			
Number of previous Bugs	Between Groups	31.906	3	10.635	9.313	.000
	Within Groups	284.362	249	1.142		
	Total	316.269	252			
Less number of planned test cases	Between Groups	13.049	3	4.350	15.098	.000
	Within Groups	71.734	249	.288		
	Total	84.783	252			
Number of modified lines	Between Groups	194.181	3	64.727	356.987	.000
	Within Groups	45.147	249	.181		
	Total	239.328	252			
Determining ownership (which is often unclear)	Between Groups	141.072	3	47.024	34.019	.000
	Within Groups	344.185	249	1.382		
	Total	485.257	252			
More number of revisions(releases)	Between Groups	139.754	3	46.585	256.927	.000
	Within Groups	45.147	249	.181		
	Total	184.901	252			
Uncovered Problem	Between Groups	169.087	3	56.362	110.803	.000
	Within Groups	126.660	249	.509		
	Total	295.747	252			
Less number of planned milestones	Between Groups	72.324	3	24.108	60.483	.000
	Within Groups	99.249	249	.399		
	Total	171.573	252			
Uncover problems	Between Groups	20.534	3	6.845	7.262	.000
	Within Groups	234.707	249	.943		
	Total	255.241	252			
Less potential risk	Between Groups	5.973	3	1.991	2.896	.036
	Within Groups	158.810	231	.687		
	Total	164.783	234			
Response from Messages (RFC)	Between Groups	139.754	3	46.585	256.927	.000
	Within Groups	45.147	249	.181		
	Total	184.901	252			
Work flow	Between Groups	118.208	3	39.403	185.250	.000
	Within Groups	52.962	249	.213		
	Total	171.170	252			
Unmovable development deadlines	Between Groups	66.587	3	22.196	36.204	.000
	Within Groups	152.654	249	.613		
	Total	219.241	252			
Involvement of many developers	Between Groups	20.430	3	6.810	26.382	.000
	Within Groups	64.274	249	.258		
	Total	84.704	252			
Change of developers in every release	Between Groups	59.653	3	19.884	60.351	.000
	Within Groups	82.039	249	.329		
	Total	141.692	252			
Experience of the developer	Between Groups	15.426	3	5.142	21.505	.000
	Within Groups	59.538	249	.239		
	Total	74.964	252			
Number of different developers who modified the file in all releases	Between Groups	35.406	3	11.802	43.423	.000
	Within Groups	67.677	249	.272		
	Total	103.083	252			
Number of different developers who modified the file in previous releases	Between Groups	21.468	3	7.156	23.824	.000
	Within Groups	74.793	249	.300		
	Total	96.261	252			
Number of different developers who modified the file for the first time in previous releases and in the next release developers was different	Between Groups	14.107	3	4.702	12.915	.000
	Within Groups	90.660	249	.364		
	Total	104.767	252			
Organization has up to date technology and processes for security	Between Groups	31.503	3	10.501	12.098	.000
	Within Groups	216.133	249	.868		
	Total	247.636	252			

The physical facilities are visually appealing and secure	Between Groups	56.363	3	18.788	23.876	.000
	Within Groups	195.937	249	.787		
	Total	252.300	252			
The employees are well groomed, background checked and security aware	Between Groups	21.468	3	7.156	23.824	.000
	Within Groups	74.793	249	.300		
	Total	96.261	252			
The security controls of physical facilities are in keeping with the kind of service provided	Between Groups	20.898	3	6.966	20.669	.000
	Within Groups	83.917	249	.337		
	Total	104.814	252			
When the organization promises to do something (eg additional controls for security) by a certain time, they do so	Between Groups	19.038	3	6.346	9.788	.000
	Within Groups	161.437	249	.648		
	Total	180.474	252			
When the customers have a problem (incident or security control related) the organization shows a sincere interest in solving it	Between Groups	38.599	3	12.866	44.113	.000
	Within Groups	72.626	249	.292		
	Total	111.225	252			
The organization is dependable	Between Groups	129.204	3	43.068	31.041	.000
	Within Groups	345.476	249	1.387		
	Total	474.680	252			
They adhere to meeting security services (physical, network, application, people as required contractually) at the times they promise to do so	Between Groups	83.053	3	27.684	37.273	.000
	Within Groups	184.947	249	.743		
	Total	268.000	252			
They provide error free security reports and records in a secure manner	Between Groups	56.363	3	18.788	23.876	.000
	Within Groups	195.937	249	.787		
	Total	252.300	252			
They communicate to customers exactly when the security services will be performed	Between Groups	287.653	3	95.884	882.604	.000
	Within Groups	27.051	249	.109		
	Total	314.704	252			
Employees / associates give prompt and secure services to customers	Between Groups	4.515	3	1.505	3.802	.011
	Within Groups	98.568	249	.396		
	Total	103.083	252			
Employees / associates are always willing to help customers in matters relating to security	Between Groups	59.653	3	19.884	60.351	.000
	Within Groups	82.039	249	.329		
	Total	141.692	252			
Employees / associates are never be too busy to respond to customers' requests on matters relating to security	Between Groups	45.015	3	15.005	22.266	.000
	Within Groups	167.799	249	.674		
	Total	212.814	252			
The behavior of employees / associates consistently instills confidence in customers with respect to security	Between Groups	20.678	3	6.893	8.200	.000
	Within Groups	209.306	249	.841		
	Total	229.984	252			
Customers feel safe in transacting business with the employees / associates	Between Groups	135.031	3	45.010	108.494	.000
	Within Groups	103.301	249	.415		
	Total	238.332	252			
Employees / associates are consistently courteous and firm with respect to security processes, with customers	Between Groups	76.312	3	25.437	36.802	.000
	Within Groups	172.107	249	.691		
	Total	248.419	252			
Employees / associates	Between Groups	34.370	3	11.457	26.581	.000

have the requisite security domain knowledge to do their job well and keep their knowledge regularly updated	Within Groups	107.322	249	.431		
	Total	141.692	252			
The organization gives each customer individual attention as warranted with respect to security	Between Groups	156.734	3	52.245	198.842	.000
	Within Groups	65.424	249	.263		
	Total	222.158	252			
The organization does have operating hours as per the convenience of the customers in matters related to security	Between Groups	93.403	3	31.134	49.253	.000
	Within Groups	157.403	249	.632		
	Total	250.806	252			
The organization has employees / associates who give personal attention to customers in matters related to security	Between Groups	32.136	3	10.712	34.124	.000
	Within Groups	78.164	249	.314		
	Total	110.300	252			
The organization has customers best interests regarding security at heart	Between Groups	35.406	3	11.802	43.423	.000
	Within Groups	67.677	249	.272		
	Total	103.083	252			
The employees / associates of the organization understand the specific security needs / regulatory requirements of their customers	Between Groups	92.947	3	30.982	60.210	.000
	Within Groups	128.128	249	.515		
	Total	221.075	252			

From the above ANOVA Table 1, it can be understood that the Sig value is lesser than 0.05 indicating the variables are highly significant

CONCLUSION

The frameworks development life cycle, in its variation structures, remains one of the most established at this point still broadly utilized techniques for software development and obtaining strategies in the information innovation (IT) field. While it has advanced throughout the years because of ever-changing situations and outlook changes pertaining to the building or acquiring of software, its focal inhabitants are as relevant today as they ever were. Life-cycle stages have experienced emphases of various names and number of steps, yet at the centre the SDLC is versatile in its time tested deployment in business, industry, and government. Actually, the SDLC has been called one of the two dominant frameworks development systems today, alongside prototyping. Thus, learning about the SDLC remains imperative to the understudies of today just as tomorrow.

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